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June 1986 VOLUME 5, NUMBER 2

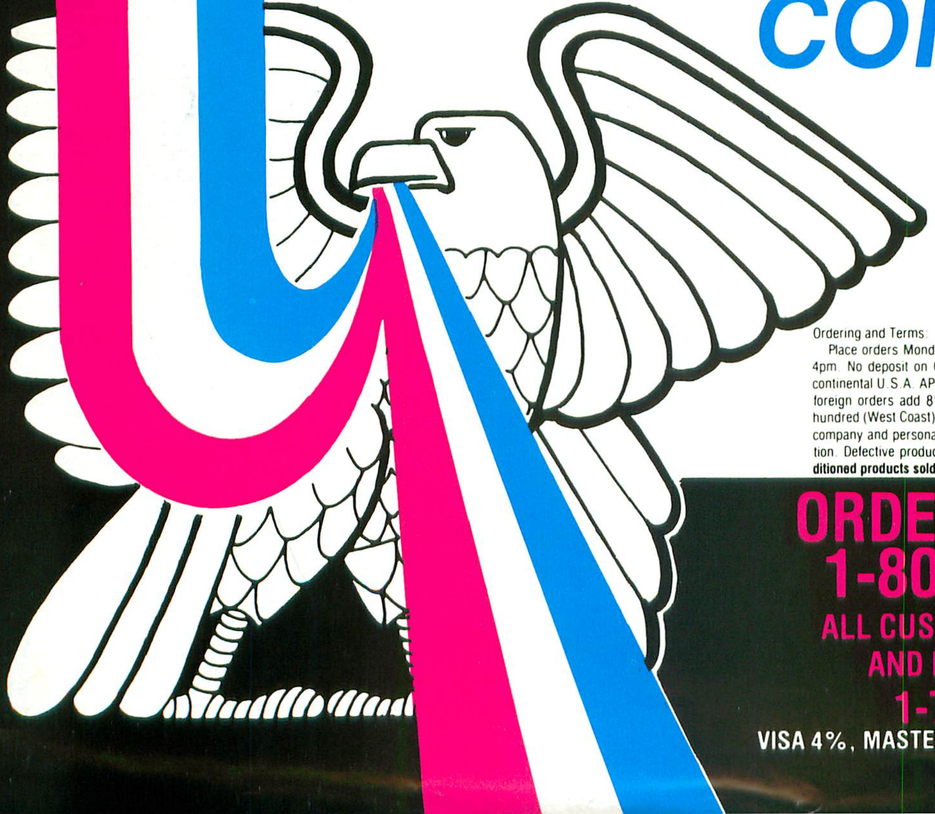


SUMMER COMPUTING
Atari Classes & Camps

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Quest of the Avatar



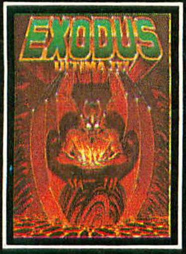
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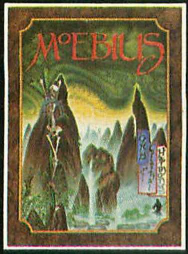
Enter Britannia, kingdom of Lord British. Journey through terrain of infinite proportions, conversing with characters on hundreds of topics. Unravel the mysteries of a superior magic system. At each turn beware of daemons, dragons and long-dead wizards haunting the most tranquil of places. Encounters with parties of mixed enemy types test your strategic abilities. Shrewd use of terrain can lead to victory against seemingly impossible odds.

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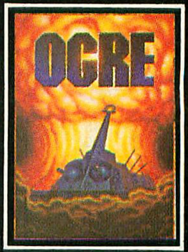
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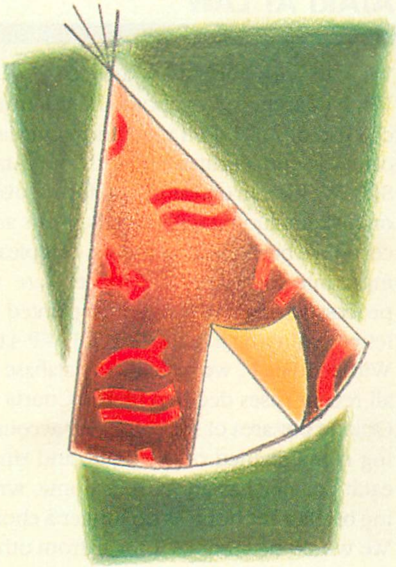
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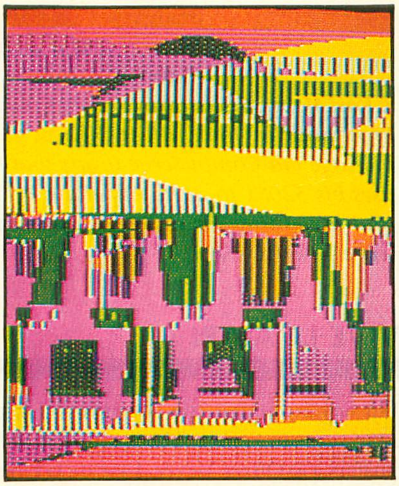
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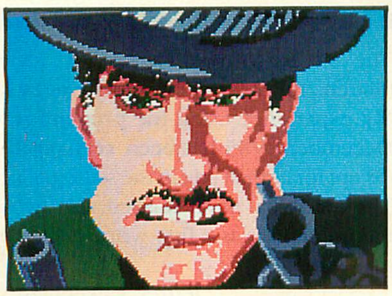
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Math Art 30



Borrowed Time 93

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SOFTWARE LIBRARY

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ST RESOURCE VOLUME 1, NUMBER 11

Antic
The ATARI Resource

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i/o board

PRINTER DRIVERS

"I recently purchased AtariWriter to go along with my GE TXP-8100/Letter Quality printer. Is there a printer driver available that will access the special features of my printer?" one reader wrote. We're constantly getting requests like this. The following printer driver programs should work:

Gary Furr Drivers—An old APX disk now available for $10 from the author. Supports the Atari 1020, 1027, IDS-480; Epson MX, RX, FX-80/100 series; C. Itoh 8510; Okidata 80, 82, 83, 84, 92 and 93; Mannesman Tally Spirit, 160L, and 180L; Diablo 620; Panasonic KX-P series; NEC 8023A; Gemini 10 and 10X; BMC pb 401; and Silver Reed 770. Write Gary Furr, P.O. Box 1073, Mountain View, CA 94042.

Printer Driver Construction Set.—$19.95 through the Antic Catalog. If your printer isn't among the several preconfigured ones, you can create your own with this disk.

*At A Glance Drivers—$14.95 for dot-matrix printers and $24.95 for daisy wheel printers. Supports most popular printers such as Epson, Star, C. Itoh and Diablo. At-A-Glance, 86 Ridgedale Avenue, Cedar Knolls, NJ 07927. Also available through **Antic** mail-order advertisers such as CompuClub.*—ANTIC ED

DOWN TO BUSINESS

I have been buying **Antic** at newsstands now since 1983. Your March, 1986 issue not only had a decent cover (as opposed to the usually kiddie-style coloring book type covers), but content to match: A business-oriented, no-nonsense issue. This reinforces my belief in the capabilities of the Atari computer and removes it from the game machine only image.

H. Gerald Wittenberg
Toronto, Ontario
Canada

I hope your new found professionialism continues and I hope covers like March '86 keep on coming!

Eugene Rhough
San Jose, CA

ATARI AT LAW

We read with interest the article *Atari at Work* (March, 1986) about the commercial use of Atari 8-bit machines. Our law office is run exclusively with our Atari 800. We have in excess of 200 forms saved on disk, including wills, deeds, trusts and corporate/business agreements. Our pleadings, interrogatories and orders are all processed on AtariWriter and printed in letter quality on a Radio Shack DWP 410. With SynFile+, we maintain a database of all recent cases decided by the Courts of Ohio in our area of specialty. Our accounting is maintained on VisiCalc, and since each partner has an Atari at home, writing briefs after hours is no longer a chore. We would be anxious to hear from other Atari lawyers.

John Lynett
Olds, Lynett & Bradshaw
49 South Main Street
Akron, OH 44308

S. Karl Mohel, the Assistant Ocean County Prosecutor in Toms, River, NJ sent us a message via CompuServe to say that he uses his 520ST to write Appellate Briefs and is waiting for more business software.—ANTIC ED

VIVE LE ATARI

I'm writing to tell you about my club of Atari users in France. The address is: Softbusters, c/o Oliver Meyer, 1 vie de la Liberation, 77436 Champagne/Siene, FRANCE.

HABAWRITER IS OK

The **ST Resource** Habawriter review (March, 1986) was substantially negative. My experience using the program since December, 1985 has been very positive, except for a small bug in the setting of tabs. The system has never crashed, and I would recommend it as a first word processing program.

Jeffrey Falkenhan
CompuServe I.D.
73147,2330

continued on page 8

i/o board

CREATIVE LIE DETECTION

It seems that your *Atari Lie Detector* program (March, 1986) could easily be adapted to the RCA jacks that exist on the AtariLab Control Module. With low prices for AtariLab, some people will be looking for new uses of this device.

Michael Martin
CompuServe I.D.
7177,3022

Rhett Bryson of the GrACE users group says he did a fascinating experiment by hooking the two clips of his do-it-yourself lie detector to one of the leaves on his house plant. He pressed a leaf on the opposite side of the plant with his finger and thumb and was surprised to see a spike show up on the graph to correspond to the pressure!—ANTIC ED

SINKING SUBS

Silent Service won't work on my Trak disk drive. The program appears to boot, but my submarine kept sinking to the bottom of the ocean. I called Microprose and they said they do their development work on Atari drives and don't guarantee that their programs will run on Atari-compatibles, such as Percom, Rana, Indus and Astra. Microprose says their new copy-protection method may be causing this problem, but nowhere on the packaging is this disk drive detail mentioned. Luckily, the mail-order house I purchased the program from sent me a refund, but the sad part is that I really wanted the game!

Karl Wiegers, PhD
Rochester, NY

"We desperately want to find an answer that will keep everybody happy," says Frank Schmidt, Microprose Director of Marketing. He says that Microprose is trying to determine which brands of third-party disk drives do not work with Silent Service. Microprose is planning to print a disclaimer on all ads and packages to warn potential customers that the program is intended for use on Atari disk drives. They suggest calling their customer service number first before purchasing the program for a non-Atari drive.—ANTIC ED

OKIMATE PAPER

I was unhappy about the poor printout quality on my Okimate 10 printer until I found a smooth paper for both color dumps as well as text—Brother brand plain paper. I bought 500 sheets from Consumer's Distribution catalog for only $6.97. The results are even better than Okimate paper, which costs $9.95 for 250 sheets.

Vincent Tan

LUNAR FUEL

Thanks for Daniel Deighan's excellent program, *Lunar Lander Construction Set.* If you're like me, you were wondering when line 230 would come into play. It has a print statement that prints "lost fuel dump". In order to find this lost fuel, guide your lander down the extreme left side of the fuel gauge and you'll receive a new supply of fuel. But remember, you can only do this once each game without destroying your lander.

Tom Ambrosio
Saxe, VA

PARTNERS IN DOS

I am a loyal fan of DOS 2.5, and my friend is a loyal fan of DOS 3. But when we trade programs, I can't put his program on my DOS 2 formatted disk.

Garrett Denzer
Kansas City, MO

Atari DOS 2.5 has a conversion utility on the disk.—ANTIC ED

MODEMS, PLEASE

I bought practically all of my Atari stuff after reading **Antic** product reviews. The disk drive, printer and other product surveys really helped. But where is the modem survey and comparison? I'm definitely buying a modem in the next six months.

You'll find help in our 1986 Telecommunications issue, coming soon.—ANTIC ED

128K DOWNGRADE?

This is an open letter to all commercial and non-commercial software writers. I have an Atari 800 with an Axlon 128K RAMpower card installed. With all the hoopla surrounding the 130XE, it seems those of us who have been using RAMdisks for years are being pushed aside. Because the new 130XE RAMdisk uses a different address for access, the older RAMdisks are not compatible with 130XE software.

My plea is this: Please try to incorporate these older, and in most cases superior, systems when you write programs for the 130XE RAMdisk. Synapse did something like this with SynCalc by making provisions for Axlon 128K boards. The main reason I haven't purchased the 130XE is because I don't want to *downgrade* from 160K to 128K.

Donel Wyman
Oskosh, WI

We'll pass your request to those submitting articles to Antic. We also refer you to the article "DOS 2.5 for Axlon RAMdisk," February 1986 ***Antic.***—ANTIC ED

AMDEK OWNERS UNITE

I would be interested in contact with other Amdek disk drive owners. As you know, almost no software was published in this 3-inch disk format. Maybe someone will even have disks to sell. My local source has dried up.

John Hawkins
64 Park Drive #C
Dayton, OH 45410

COUNTRY ATARI

Thanks for publishing such a fine magazine. I run a bulletin board on my 130XE here in Texas with 360K of online storage dedicated to country music information. Call "The Gate" at (817) 865-5259, from 6 pm to 6 am, seven days a week.

Bennett Hamilton
Music director, KPEP
Gatesville, Texas

i/o board

PERCOM REPAIRS

In response to a number of queries from readers seeking repairs for their Percom disk drives, ***Antic*** *has learned that a nationwide Percom repair contract has been awarded to STS Computers, 1073 W. Broad Street Falls Church, VA 22046. (703) 237-0558. Contact STS first for information about repair rates and shipping.*—ANTIC ED

antic online

Worldwide Users Network

WUN Disk Library Planned

Type GO ANTIC when you log onto CompuServe in May. This month on ANTIC ONLINE you'll find in-depth coverage of the Worldwide Users Network (WUN) project to create a national library of high-quality public domain disks.

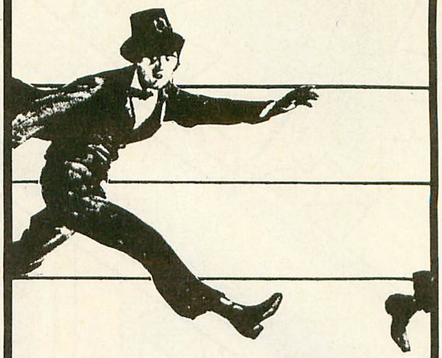
The planned monthly public domain disks would be sold at meetings of Atari users groups affiliated with WUN. The disks would be fund raisers for the users groups—as well as for WUN itself, which is now headed by users representatives.

Antic and Atari have both said they would be willing to donate some programs for these disks. The future PD disk library is envisioned for both STs and 8-bit Ataris. Software for the library would be chosen by a yet-to-be-named blue ribbon users committee. Online WUN Board meetings are on CompuServe the first Wednesday of each month at 10 p.m. Eastern Time. Anybody interested is welcome to look in, although only WUN Directors can take part in the discussions. For more details, see the WUN Message Board on the SIG*Atari 16-bit section.

SIGNING UP

If you're not a CompuServe subscriber yet, see your local computer dealer or phone (800) 848-8199 for information about signing up. Ohio residents phone (614) 457-0802. There is no extra charge for accessing ANTIC ONLINE.

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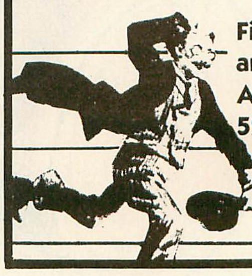
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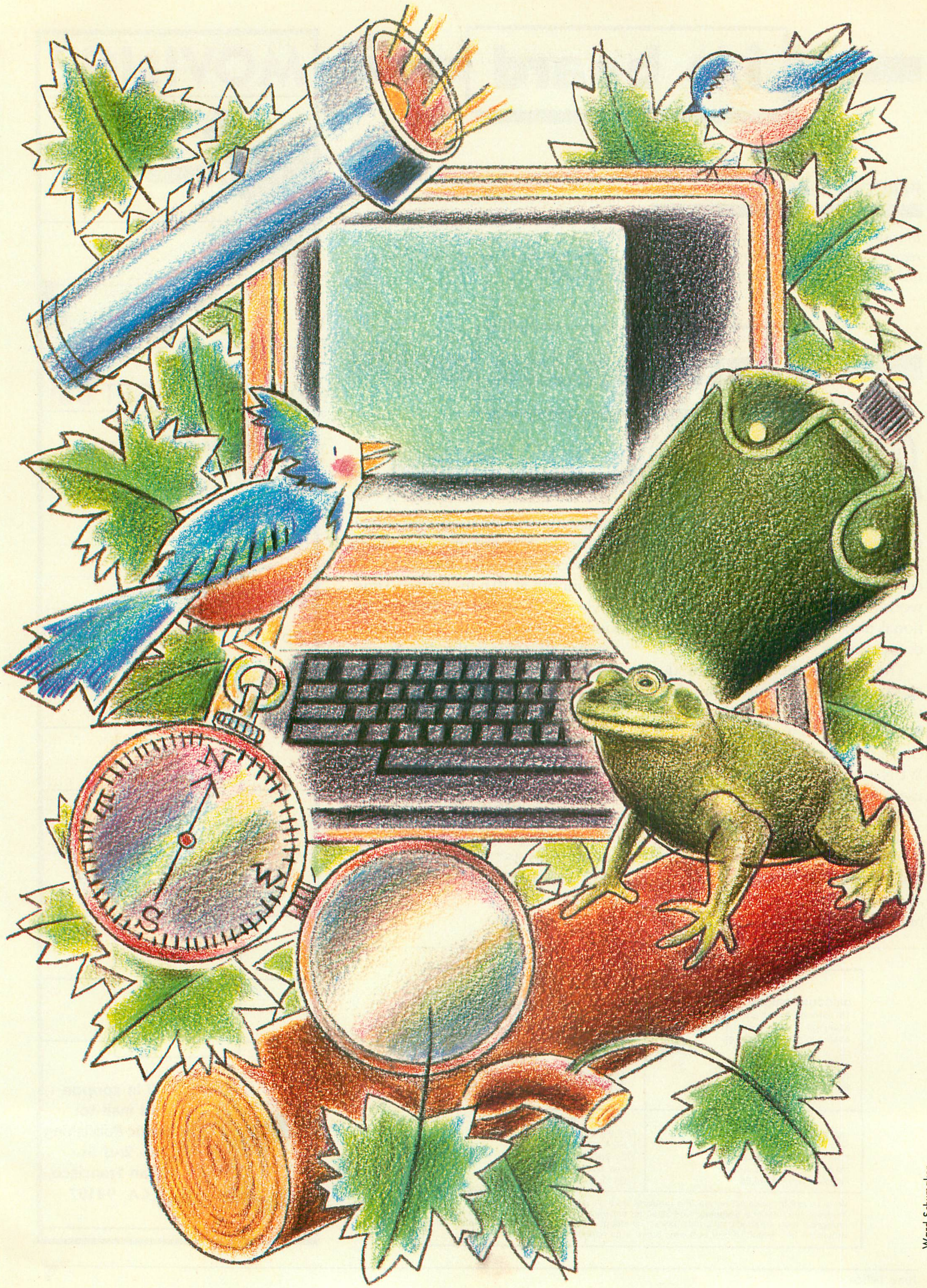
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SUMMER FUN ATARI STYLE

CAMPS, CLASSES, MUSEUMS AND MORE

by GIGI BISSON, **Antic** Assistant Editor

We are the PacMen, tall and straight, in our feathers and war paint. Pow Wow. Pow Wow. We are the men of A-tar-i. *—variation on a classic camp song*

When children aren't squealing and laughing, you can hear the sounds of summer. The wind rustling the leaves, rushing water, the chatter of frogs and crickets. . . and little fingers busily tap-tapping away at the keyboard. Logo and lakes, silicon and sunshine, computing and campfires? It may seem like a strange combination, but computers have now become a fixture at one of the most traditional of American institutions—the summer camp.

The contemporary summer camp, no matter how remote, is not only likely to generate its own electricity to power all those computers, it might also have a color photography darkroom, a ham radio station, or an electronics and robotics workshop. Marshmallow roasts and campfires aren't enough anymore—camping is now an educational exprience.

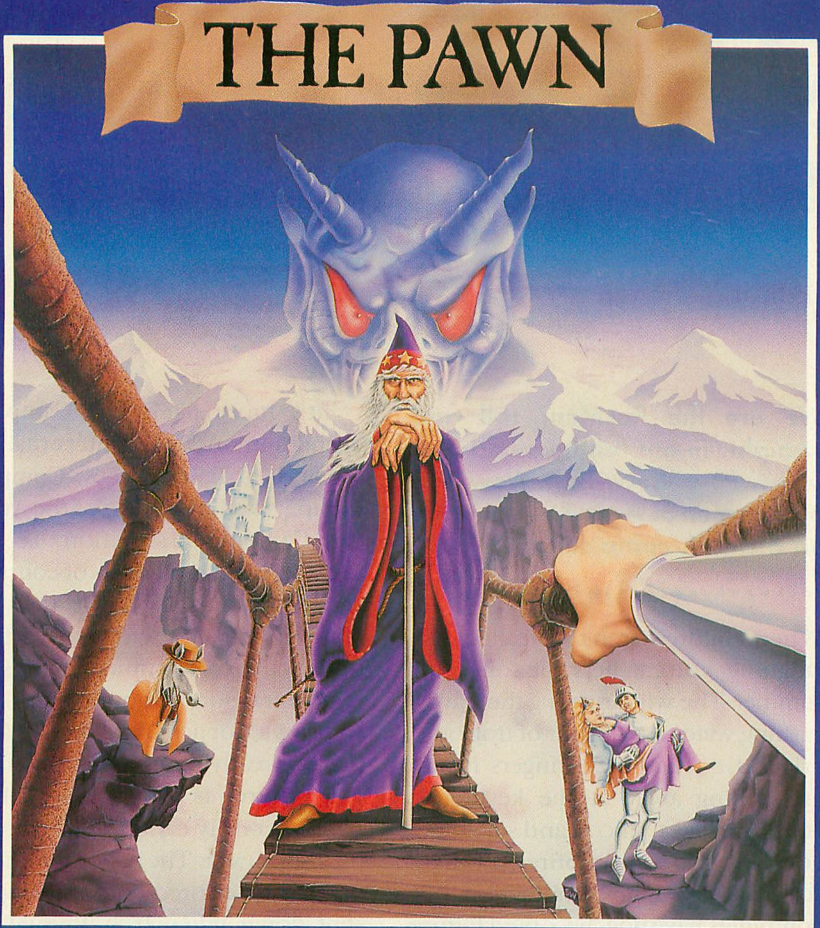
"It's more likely for Camp Tall Teepees to offer computers than it is to find a Tall Teepees Computer Camp." says Jim Le Mon of the American Camping Association. Le Mon says there are three kinds of computer camps—traditional camps that offer computing plus a wide range of outdoor activities, computer camps that concentrate on computing and offer some outdoor activities, or day camps that are really computer workshops.

If there is any news about computer-only camps, it's that many no longer exist. The nationwide chain of Atari-sponsored computer camps shut down when Jack Tramiel purchased the company. The largest chain of computer camps in the nation, Original Computer Camp, also closed its doors in 1984.

Camp directors say that computer camps lost favor when most schools started teaching computing as a regular activity. "When the price of computers dropped, that hurt us the most," says Roy Oken, director of now-defunct River Way Ranch Com-

continued on page 13

A rare species of interactive illustrated fiction for the Atari ST



Magnetic Scrolls
AUTHORS

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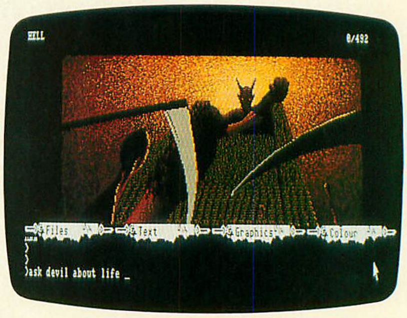
RAINBIRD
UK PUBLISHER

This illustrated adventure is destined to rival all the classics. Stunning graphics are the icing on the cake – but underneath lies the most advanced text operating system yet developed.



The story is absorbing, humorous, lively, full of intrigue and puzzle, yet subtle enough to appeal to the beginner and the hardened adventurer alike.

'The Pawn' understands **plain English,** it knows the size, volume and weight of the game objects, their texture, and their magical properties (in fact the program stores 135 pieces of information for each object).



The game is **truly** interactive, each character in the plot has a personality (even the animals!) and will respond intelligently to conversation...

'The Pawn' and further adventures will be available for all leading personal computers.

Guaranteed to make a major impact on the market.

FIREBIRD HOTLINE ☎ 201 934 7373

continued from page 11

puter Camp. "It got cheaper to buy your kids a computer than sending them to camp for a week."

The most successful computer camps blend camping with nature. "With all that outdoor activity, why would kids want to be penned up inside?" says Warren Darner, the computing teacher at Camp Regis Applejack in New York's Adirondack mountains. Darner's roomful of VIC-20s has to compete with seven tennis courts, a 22-boat sailing and motorboat fleet, and a performing arts studio. "But we do get real busy on a rainy day." he says.

Nevertheless, the best computer camps are still thriving. I found 337 different camps that offer computing as an activity—and that only includes camps accredited by the American Camping Association.

WHY A COMPUTER CAMP?

There are three good reasons to send your kids to a computer camp:

1. Schools with anemic budgets can't privide adequate computer instruction. If schools do have computers, kids often have spend more time waiting in long lines than they do online. One alternative for concerned parents is a computer camp.

2. Some kids love computers so much that they refuse to go unless there's a computer at camp.

3. You're afraid your kids are turning into hackers and you hope they'll learn how to swim, sail, hike and get some fresh air.

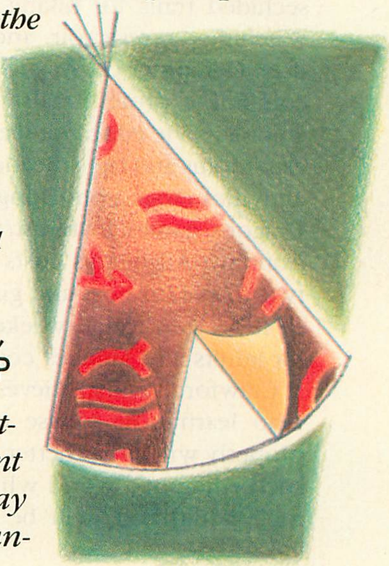
The camp setting offers an opportunity to become immersed in computers—even three hours of computer instruction a day is a lot more than they'll ever get at school. Kids don't just learn how to use a word processor—they use it to write letters home to mom and dad. Arts and crafts could be pressing wildflowers one day, and designing a weaving pattern on a computer the next.

But as with anything that's Atari-specialized in the Apple-dominated world of educational computing, finding a camp that uses Atari computers involves a diligent search. Here are a few to get you started:

WHERE TO FIND A CAMP

The premiere camping resource is the ***American Camping Association (ACA) Annual Parent's Guide to Accredited Camps.*** *This 253-page nationwide directory lists only camps accredited by the ACA. It indexes them by name, activities, location and special programs such as camps for hemophiliacs or the blind.*

Most importantly, the ACA catalog lets you compare prices. That alone is worth the $8.95 price of the book, ($10.95 outside the continental U.S.), which is refunded if you enroll in one of the thousands of ACA-approved camps for at least 14 days. For an additional $10, the ACA computers will select a list of 10 camps meeting your special needs.



ACA Parents Guide, 100 Bradford Woods, Martinsville, IN 46151, (800) 428-CAMP

For additional camp listings in the Eastern U.S., check the camping advertisement sections of the New York Times Sunday Magazine. For Western camps, check Sunset Magazine.

COMPUTING TRADITION

"**Camp Diana-Dalmaqua** is a very traditional camp," says director Judy Alter. Traditional, huh? Diana-Dalmaqa may offer those good old-fashioned camp activities like nature and science, swimming on a 30-acre lake and pioneering. But it also has go-karting, and programming on 12 Atari computers. One of the oldest facilities in the U.S., this co-educational camp 85 miles north of New York City was extablished in 1928.

Camp Diana-Dalmaqua, 209 Traymore Boulevard, Island Park, NY 11558. (516) 431-0641.

FORESTRY AND FORTRAN

They may have a hokey advertisment featuring a girl hacking on a computer as she lies down on a diving board dangerously close to a swimming pool full of water. But don't be fooled. **Midwest Computer Camp** is the Cadillac of computer camps and one of the few that offers nearly every conceivable model of computer from Atari to VIC-20. Students are encouraged to use a variety of different computers to develop true skill with the language or application they are learning. They can choose from BASIC, Pascal, Fortran, COBOL, Pilot, Logo and assembly language. And they can learn about robotics, lasers, holography, and how to run a bulletin board.

Computing comes first, but not at

continued on next page

the expense of nature. Lynn Crawford, founder and "Chief Kid" of Midwest Computer Camp is a wildlife refuge developer as well as a programmer. For him, balancing both technology and nature is a priority. Kids spend six hours on the computers every day and six hours outside.

Situated on a magnificent old estate in a wilderness area northwest of Indianapolis, Indiana, the camp has secluded trails for hiking and bird watching, a reservoir and grazing deer. Computer classes are taught by computing professionals in a huge colonial-style education center with classrooms and large meeting rooms. Activities range from Dungeons and Dragons games to forestry and astronomy. All of this costs $750 for two weeks for boys and girls aged 8 to 18. A year-round weekend camp for adults and families costs $60.

Crawford firmly believes that kids who learn how to use computers properly will have a better chance of succeeding in a world which, upon their adulthood, will be pervaded with the machines. "We are teaching tomorrow's teachers," he says.

Midwest Computer Camp, 9392 Lafayette Road, Indianapolis, IN 46278. (317) 297-2700.

YMCA Camp Ralph Mason in Blairstown, New Jersey offers swimming, horseback riding, Honda bikes, canoe trips and programming on Atari and Apple computers for kids 8-16.

YMCA Camp Ralph Mason, Route 3, Box 41, Blairstown, NJ 07825. (201) 362-8217.

CIRCUS AND COMPUTERS

"Dear Mom: Having a great time. I learned PASCAL and C language in computer class. Yesterday, I did a double flip on the trapeze, then ate fire. Please send some more floppy disks. Love, Billy."

This is a letter from a camp for the '80's. And yes, Billy really can learn how to eat fire at **New England Computer Camp**, located on the campus of an elegant Tudor-style boarding school surrounded by forest.

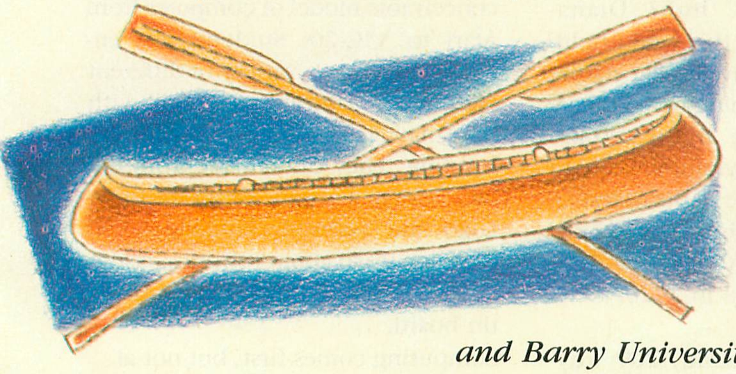
"It all started with a counselor who knew how to juggle," says Camp Director Clark Adams, "then it just grew into a circus program that'll knock your socks off." Now NECC has expert trainers from the Flying High Circus of Florida State University, complete with high-wire walking. But the circus takes second stage to computing in Pascal, Assembly language, C, Forth, APL, LISP and exploring the HERO-1 robot. If you don't mind sending the kids to (horrors!) a non-Atari camp, or the $945 fee for a two-week session, this unique program might be the perfect balance of mental activity and non-competitive physical activity for your child.

New England Computer Camp, 79 Ringgold Street, West Hartford, CT 06119. (203) 236-3473

SUMMER COLLEGE FOR ALL

Many colleges and universities also offer summer computer camps and workshops for the general public, in order to utilize idle campus computer facilities. Contact the extended education department of the university nearest you. It couldn't hurt to ask.

The following colleges offer summer computer education instruction for teachers, leading to Education degrees. And all these campuses utilize Atari 800 computers: University of Wisconsin, Madison; Western Washington University, Bellingham; Lesley College, Cambridge, MA; Fresno Pacific College, CA; and Barry University of Miami, FL.



FAMILY COMPUTER VACATIONS

There's one very good reason to combine computers with your next vacation—if the computer instruction enhances your work skills, the seminar portion of the vacation qualifies as a tax deduction.

"This summer, don't just send your children to a computer camp. Come with them." So says the brochure for **Family Computer Camp**. Located on the 600-acre wooded campus of Clarkson University near the Canadian border in Potsdam, New York, this is one of the few camps that makes computing a family affair.

"It's a good opportunity for a professional to learn a valuable job skill while enjoying a summer vacation for the whole family," says director Estella Bray. Mom and Dad learn word processing, Lotus 1-2-3, and dBase-II on IBM-compatible Zenith Z-100 computers. Teenagers learn how to program in BASIC, with an emphasis on graphics and game-writing technique, on Atari 400 and 800 com-

puters. Kids 8-13 learn graphics, BASIC and word processing on the Ataris. The little ones, 5-7, learn how to program in Logo on the Apple II and Commodore VIC-20. The instructors are professional educators and engineers.

A typical day includes six hours of class and computer labs and plenty of time to play volleyball, tennis and golf, enjoy the hiking trails and swimming pool, or go canoeing on the nearby St. Lawrence river. This summer, there will be a field trip to a local music theater, and visits to the computer aided design/manufacturing and robotics laboratories at the university. But the most rewarding part of the experience, Bray says, "is getting three generations together." The week's tuition is $250 per person for the first two family members, and $190 for each additional member. The whole family can stay in a two-bedroom townhouse for an additional $158.

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WEATHER WIZARD

FORECAST THE WEATHER WITH YOUR ATARI

Program by RICHARD STAERZL
Article by CHARLES JACKSON

You and your Atari can now forecast the weather without checking the newspaper or watching an obnoxious TV weatherman. Weather Wizard is a BASIC program which works on all 8-bit Atari computers of any memory size.

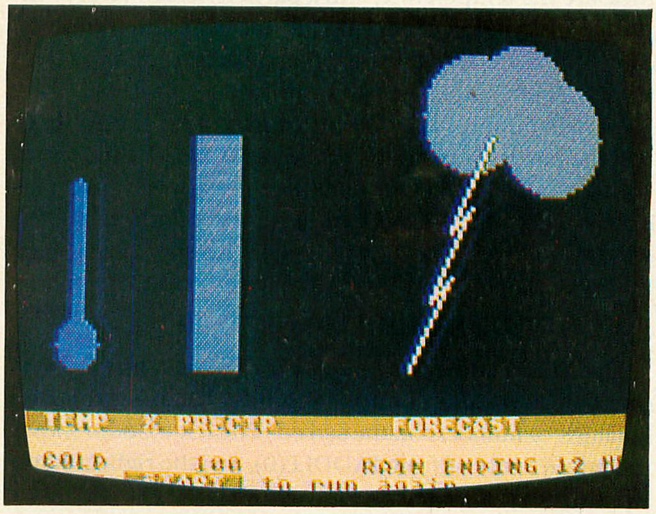
Would you like to see more up-to-the-minute weather predictions than what's printed in your morning newspaper? Are you sick of your local TV weatherman's silly hats and awful jokes? Be your own weather forecaster. Just type in the latest wind direction, sky condition and two barometric readings. Weather Wizard and your Atari will do the rest, giving you a delightful audio-visual reading. (If you don't own a barometer, you can obtain barometric data from your daily newspaper or a weather broadcast.)

Type in Listing 1, WEATHER.BAS, checking it with TYPO II, and SAVE a copy before you RUN it.

Weather Wizard asks you for the previous barometer reading, then the current barometer reading. It uses a pair of readings to determine whether the barometric pressure is rising or falling. The program accepts barometer readings between 28 and 31 inches of mercury. If you enter pressures which do not fall within this range, Weather Wizard will buzz, give you a BAD DATA message, and let you try again. Otherwise, the program issues a mild "beep" and proceeds with the next question.

Now, type in the elapsed time, in hours, between the two readings. If the last reading occurred a half hour ago, for example, you'd enter 0.5 as the elapsed time. Weather Wizard will not accept an elapsed time of zero hours. If you entered a zero, the program will ask you again for the elapsed time.

Next, Weather Wizard will ask you for the current wind direction. Weather Wizard wants to know the direction



the wind is coming *from*. In other words, if the wind blows your hat off, and the hat sails east, it's a *west* wind.

No need to convert the wind direction into degrees. Weather Wizard accepts the standard N, S, E, W, NE, NW, SE and SW abbreviations. Just like an adventure game.

Now, peek out the window and tell Weather Wizard the current sky conditions. You may choose between **C**lear, **P**artly cloudy, **M**ostly cloudy, **O**vercast and **R**ain. Type the appropriate letter and press [RETURN].

The hard part's over. Sit back, and Weather Wizard will present the forecast in a colorful graphic display, followed by a written forecast. At the top left of your screen, you'll see a drawing of a thermometer. Its color represents the temperature trend. A blue thermometer indicates a cooling trend, and a red thermometer represents a warming trend.

Off to the right, you'll see a colorful icon representing the present forecast. The sun stands for fair weather, and a cloud foreshadows rain or snow.

The bar graph in the center of the screen indicates the

continued on next page

probability of precipitation. Finally, Weather Wizard prints a short forecast beneath the graphics display.

If you have a printer connected and turned on, Weather Wizard will *automatically* make a hard copy of the graphics display and the forecast. Weather Wizard will work with *any* printer, even producing the graphics on daisy wheel models.

HOW IT WORKS

Weather Wizard bases its predictions on several simple forecasting "rules" which are fairly accurate for locations in the Northern hemisphere. For example, winds coming from the South indicate a warming trend, while North winds usually precede a cooling trend. The forecasting algorithms are in lines 230-430.

EXPANDING THE PROGRAM

For a few dollars and a spare set of paddle controllers, you can turn your Atari and Weather Wizard into an automated weather station that senses the temperature and humidity.

You'll need a thermistor (Fenwal Model GA45P2) to measure the temperature, and a particle sensor (Devry Industries Hygropak Model HA) to measure the humidity. These parts are available for a few dollars from most electronics supply houses.

We will connect the thermistor to paddle controller 0, and the particle sensor to paddle controller 1. Since both paddle controllers go through the same joystick port, it's easy to get them confused with each other. To tell PADDLE(0) from PADDLE(1), type in this short BASIC line and type RUN.

```
10 ? PADDLE(0),PADDLE(1):GOTO 10
```

Plug your paddle controllers into joystick port 1. Twist one of the paddle controllers while watching the two columns of numbers on the screen. The left column shows the values returned from PADDLE(0), and the right column shows the values returned from PADDLE(1). In other words, if the controller you're twisting is changing the values in the left column, you're twisting PADDLE(0). Otherwise, you're using PADDLE(1).

Remove the two screws from the back of a paddle controller, and remove the plastic cover. Find the potentiometer (the round metal component in the center of the controller) and carefully cut and strip the two wires leading to it. Repeat this procedure with the other paddle controller.

Connect the thermistor to the wires you cut on paddle (0), and connect the particle sensor to the wires you cut on paddle (1). Do *not* replace the plastic paddle covers. Finally, plug the paddle controllers into joystick port 1.

It's easy to use your new weather sensors with Weather Wizard. Just change line 15 from **SENSORS=0** to **SENSORS=1**, and hang your sensors out of the window.

If you find that your temperature or humidity readings are not quite right, feel free to change the values of MTEMP, BTEMP, MHUM and BHUM in lines 16 and 17. MTEMP and BTEMP are used for changing the values from the thermistor into temperature readings. MHUM and BHUM are used for changing the values from the particle sensor into humidity readings. You'll need two accurate temperature and humidity readings to recalculate values for the constants in lines 16 and 17.

Let's recalculate our temperature constants, MTEMP and BTEMP (lines 16 and 571). For those familiar with mathematics, we're using the *slope/intercept* method to derive our formulas.

We'll call our two temperature readings (as taken from a thermometer) TCOLD and TWARM. The formula for MTEMP is:

$$\frac{\text{TWARM} - \text{TCOLD}}{\text{PEEK(624)}_{\text{warm}} - \text{PEEK(624)}_{\text{cold}}} + 0.5 = \text{MTEMP}$$

and the formula for BTEMP is:

$$\text{BTEMP} = \text{TCOLD} - \text{MTEMP} * \text{PEEK(624)}_{\text{cold}} + 0.5$$

You may use the same method to find the humidity constants MHUM and BHUM (lines 17 and 572). (But make sure you use PEEK(625) instead of PEEK(624)!)

Industrious programmers may want to use the actual conversion formulas (lines 571 and 572) in their own programs to build computerized thermographs, thermostats and systems to monitor and regulate plant growth.

Weather Wizard will help you accurately predict the weather while you learn about meteorology.

Richard Staerzl is an Atari programmer from Fond du Lac, Wisconsin.

Listing on page 112

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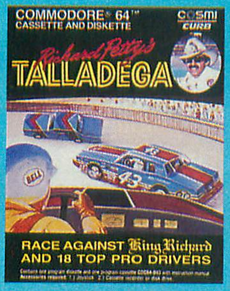
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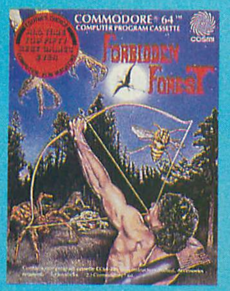
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DECIDE

BUSINESS DECISION ANALYSIS TECHNIQUES

by JEFFREY SUMMERS, MD

Think-tanks and major corporations often rely on computerized analysis techniques to help decide among complex alternatives. This tutorial article shows you how to use these principles to design your own "decision tree." The accompanying BASIC program processes your decision tree calculations. The program works on all 8-bit Atari computers with minimum 48K disk or 32K cassette.

Here's the problem. You are the CEO of MegaCorp and your multinational corporation wants to manufacture a product for marketing in the United States. Three sites are under consideration for the new factories. But each has its own advantages and disadvantages.

The first site is here in the U.S. and the estimated profit would be 80 cents per item. The second site is in Country A, where labor and other costs are lower—but insurgent groups are fighting the government. Best estimates are that there is a 15% chance of a revolution. If there is a revolution, then there will be a 50-50 chance that the industries will be nationalized. If all goes well, the profit per item will be 87 cents. However, the profit will be reduced to 85 cents if there is a revolution without nationalization. If the industries are nationalized, then there will be no profits at all.

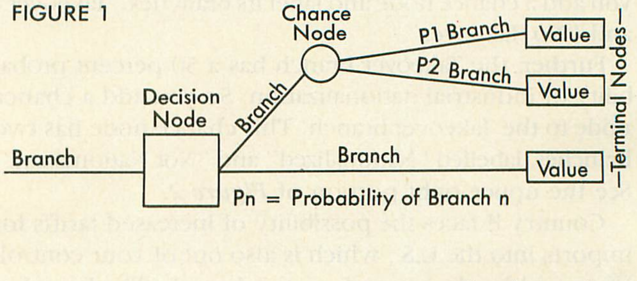
The third site is in Country B, which has a stable government. But the U.S. is considering raising the tariff duties on merchandise imported from there. The profit per item will be 84 cents if the tariffs remain the same, 78 cents if the tariffs are raised. Your political analysts have determined that there is a 20 percent chance of the change in tariffs.

It's a tough decision! However, the technique of computerized decision analysis (CDA) allows for the calculation of the best choice. If you have ever wondered how economists or political scientists use computers to simulate and test alternate scenarios for future events, this article will introduce you to the concepts and techniques of CDA.

Then after you learn how to design your own decision tree shells, you can use the accompanying BASIC program to process all the calculations needed to arrive at the most suitable decisions.

This decision analysis technique uses a tree type of data structure. It is helpful to think of the decision "tree" as a roadmap. The diagrammed route is made of *branches* that are connected by *nodes*. These nodes are like forks in the road—where there is more than one path ahead. Branches are the labelled paths leading *away* from the node. A node has the same label as the branch which led *to* it.

FIGURE 1



continued on next page

The three types of nodes are shown in *Figure 1.* A *decision* node represents a choice that you can control. ("Should I manufacture in Country A, Country B, or the U.S.?") Decision nodes are indicated by squares.

A *chance* node represents a path determined by factors beyond your control. For example, "Will there be a revolution in Country A?" Chance nodes are indicated by circles.

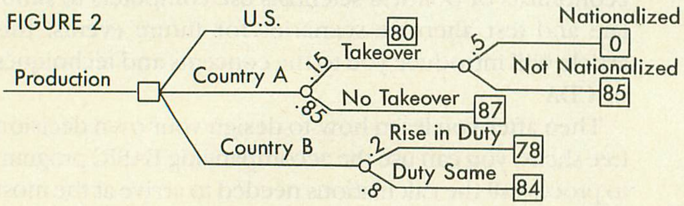
Each of the branches leading from a chance node has an associated probability of being taken—as in a 20 percent chance of revolution. These probabilities are marked on the branches as they leave the node.

A third type of node occurs at the end of each path and is therefore called a *terminal* node. The terminal node is indicated by a rectangle displaying its value, on any relevant scale. The possibility, "We'll make 87 cents profit per item if you decide to manufacture in Country A and all goes well" is an example of a terminal node.

TREE DIAGRAM

Figure 2 is a diagram of MegaCorp's multinational profit problem using the above symbols. You start reading this diagram from the *left*—that's the bottom of the tree. To begin with, you have the choice between three manufacturing sites—the U.S., Country A and Country B.

FIGURE 2



The first alternative, manufacturing in the U.S., would lead directly to a terminal node. Nothing more needs to be considered if this option is chosen. Assign this terminal node a value of 80—the profit per item if you manufacture our products in the U.S.

The second alternative, manufacturing in Country A, has several other considerations. The first is whether or not a takeover occurs. You have no control over this, so you add a chance node and label its branches "Takeover" and "No Takeover."

Further, the Takeover branch has a 50 percent probability of industrial nationalization. So you add a chance node to the Takeover branch. This chance node has two branches, labelled "Nationalized" and "Not Nationalized." See the upper right portion of *Figure 2.*

Country B faces the possibility of increased tariffs for imports into the U.S., which is also out of your control, so you add a chance node to this branch. The branches from this node are labelled "Rise in Duty" and "Duty Same." Each of these branches end in terminal nodes with profit values assigned as stated earlier in the problem (78 cents per item if the tariffs are raised, 84 cents if the tariffs remain the same). We have now completed our tree. See the lower right portion of *Figure 2.*

TREE SOLVING

Now that you have this tree, what do you do with it? Essentially, you need to assign values to each of the nodes you have created, working all the way back from the "treetop" to the first decision node. The process of solving the tree is governed by two basic rules:

1. The value of a decision node is the maximum or minimum—whichever is more desirable—of all values in a pathway that goes *away* from it.

2. The value of a chance node is the sum of the values of all branches that come from it, multiplied by their respective probabilities (p1 * a1 + p2 * a2, etc.).

For example, if you decide to manufacture in the U.S., your profit would be 80 cents per item (shown in the pathway's terminal node). Since there are no chance nodes to complicate this calculation, the value of that pathway's decision node would also be 80. You must then repeat this process for any other alternative pathways leading from this decision node.

Our sample problem has only one decision node, which makes it comparatively simple. If a problem has multiple decision nodes, we must solve and assign a value to each one. Thus, after solving each decision node we would assign it a "terminal node" value, while we continue to work our way back downward to the root decision node.

Let's find the value of the decision node for the Country A. Working backwards from the terminal nodes, you see that you'll make 87 cents per item if there is no takeover. And remember, there is an 85 percent chance of this happening. This branch has a value of (87) * (.85), or 73.95.

If there *is* a takeover, there is a 50-50 chance of industrial nationalization. If the industries become nationalized, our profit-per-item is zero, and the value of the Nationalization branch is equal to (.5) * (0), or 0. If the industries do not become nationalized, our profit would be 85 cents, and the value of this branch would be (.5) * (85), or 42.5.

Again, you'll only reach these branches if a takeover occurs. Since there is a 15 percent chance of this happening, you add your Nationalized and Not Nationalized totals together (42.5 + 0) and multiply it by the probability of a takeover (.15) to find that the value of the Takeover branch is 42.5 * .15, or 6.375.

Now, you add the value of the No Takeover branch (73.95) to the value of the Takeover branch (6.375) to find that the value of the Country A branch is 73.95 + 6.375, or 80.325).

continued on page 26

continued from page 24

By the same method, you find that the value of the Country B branch is 82.8.

Now you have all the information you need to make a decision:

Branch:	Value
U.S.	80
Country A	80.325
Country B	82.8

Since you wish to maximize your profits, you should make the product in Country B.

This problem has only 10 nodes, yet it takes a fair amount of time to calculate. What if you weren't sure about the chance of takeover? Would the decision change if the risk was only 10 percent? Five percent? Recalculating the tree for multiple probabilities would be tedious—and didn't you buy your computer to simplify these chores?

THE PROGRAM

This program allows computation of trees up to 200 nodes in complexity, and allows quick recalculation of the tree with changed what-if values.

Type in Listing 1, DECIDE.BAS, check it with TYPO II and SAVE a copy before you RUN it.

To use this program for help with making your best decisions, you must first design your decision tree on paper. Assign values to each of the possible outcomes, and estimate the probabilities at each chance node. We'll use the MegaCorp problem example and the tree as outlined in *Figure 4.*

Type RUN and choose the New Tree option to enter your tree.

The program asks for the first node's type—decision, chance or terminal. Choose option 1—decision. When asked for the number of branches leading from this node, respond with 3. The program can handle up to five branches from each decision node or chance node.

Every node is labelled according to the branch, or path, leading to it. Since this is the first node, and has no paths leading to it, you'll arbitrarily label it "Production."

You are then asked about node 2, (branched from node 1). This node represents manufacturing the product in the U.S. Since it is a terminal node, choose option 3 and enter a terminal value of 80. Label this node "U.S."

Node 3, also branched from node 1, represents Country A, and should be labelled as such. (This is where you branch to the "Takeover" and "No Takeover" nodes). Node 3 is a chance node (option 2) with two branches. The probability of the Takeover branch is .15 and therefore the probability of the second branch (No Takeover) is .85.

Node 4, representing Country B, is thc final branch from node 1. It is also a chance node with two branches. This time, the probabilities are .2 ("Rise in Duty") and .8, ("Duty Same").

The fifth node—branched from node 3—is Country A's Takeover node. It's a chance node with two branches and equal probabilities of .5 and .5. Label this node "Takeover".

Node 6, again from node 3, is Country A's "No Takeover" node, a terminal node with a value of 87.

Node 7 is a terminal node, coming from node 4 (Country B). It has a value of 78. Label this node "Rise In Duty."

Node 8, also from node 4, is another terminal node. Its value is 84, and is labelled "Duty Same."

Node 9 comes from node 5 (Takeover) and is a terminal node which you will label "Nationalized." This node has a value of 0.

Finally, node 10 comes from the same node as 9, and is another terminal node. It has a value of 85, and is labelled "Not Nationalized." The program now sees a completed tree and returns you to the main menu.

THE RIGHT PATH

Save the tree by choosing the Save Tree option and then entering a legal filename. Later, you can recover the tree, with values intact, by using the Recover Tree option and entering the same filename.

Now solve the tree. Choose the Solve Tree option and the program will ask you whether you want to maximize or minimize your results. Since you want the results to lead to maximized profits, select option 1.

After a few seconds the main menu again appears. To see the results, choose the Print Tree option. Enter a legal filename or device at the "Output to:" prompt and the tree will be printed. You may print the tree to a disk file, to your screen, or to a printer. Using a printer makes the output easier to follow.

Each node in the output is identified on the first line by its node number and label. The type and value are on the second line. The next line states where the node branched from. (The first node branched from node 0—the root of the problem.) The following lines list the branches from this node. Chance nodes give the probabilities of each of their branches. Terminal nodes have no branches and these lines are omitted.

To see which branch should be taken at a decision node, remember that the optimum branch will always have the same value as the decision node. (This will be the highest value if you're maximizing, and the lowest value if you're minimizing.) In this example, you can expect an average profit of 82.8 cents per item by choosing Country B—node 4 matches node 1.

EDITING THE TREE

Choose the Edit Tree option and you can add branches and nodes, delete branches and nodes, change probabilities and labels. You are asked for the node number you wish to edit (entering a zero returns you to the main

menu). Perhaps you want to see if changing the probabilities of takeover would change your decisions. These probabilities are governed by node 3, the chance node labelled Country A.

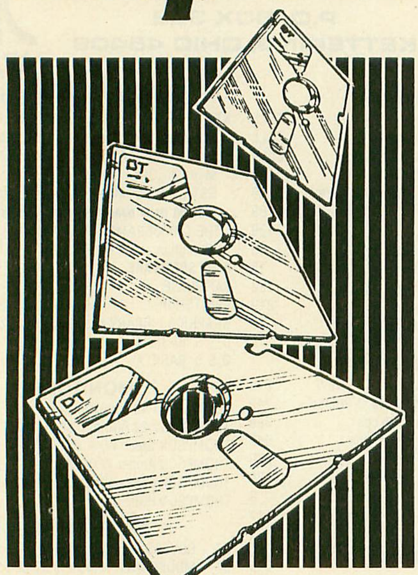
After typing a 3 you are given a sub-menu. Choose option 4 to change the probabilities. You are given a list of the branches and probabilities from this node, then you're asked for the new probability of a branch to node 5. Enter .10. (Thus, the probability of a branch to node 6 is .90.) Exit with option 0 and node 0, solve the tree again and print it. Does that change the decision?

Try repeating the above steps to change the probabilities to .05 and .95. Now the decision changes to Country A. Testing your conclusion by varying the data you have the *least confidence* in can give you a better idea of the validity of your decision. This is called "sensitivity analysis." Finding the point where the decision changes from one option to another is called "threshold analysis." In this case that point is where the probability of government overthrow is somewhere between 5 and 10 percent. If you feel ambitious you can try to find the exact number.

Jeffrey Summers, MD is a practicing internist in Rochester, NY. He has been programming the Atari for three years and is interested in computer applications for medicine.

Listing on page 105

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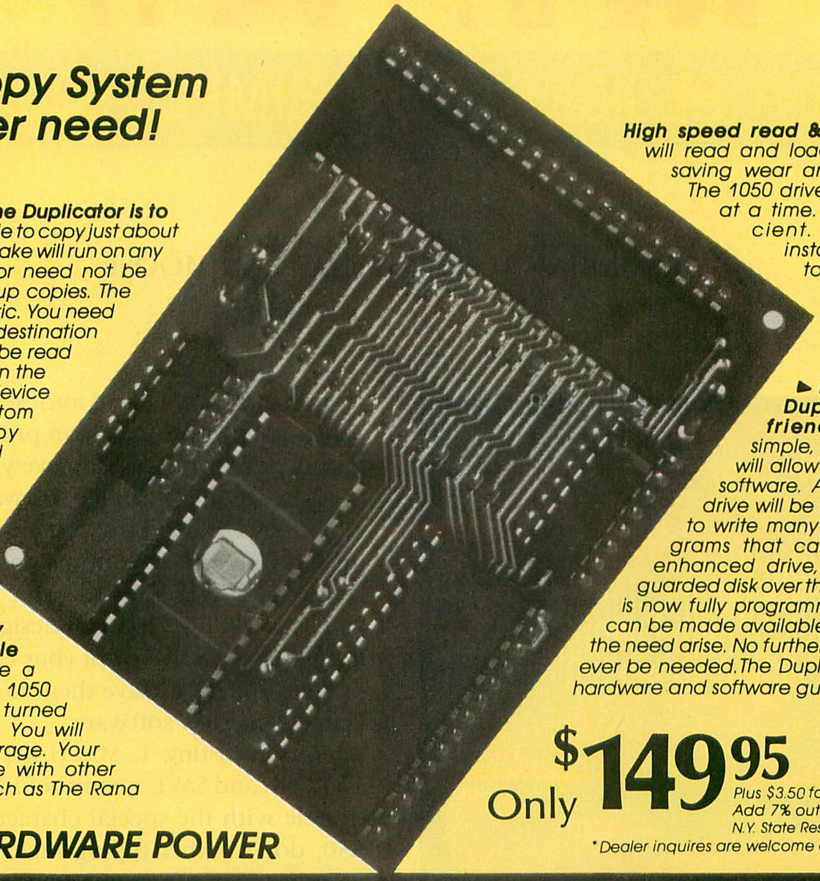
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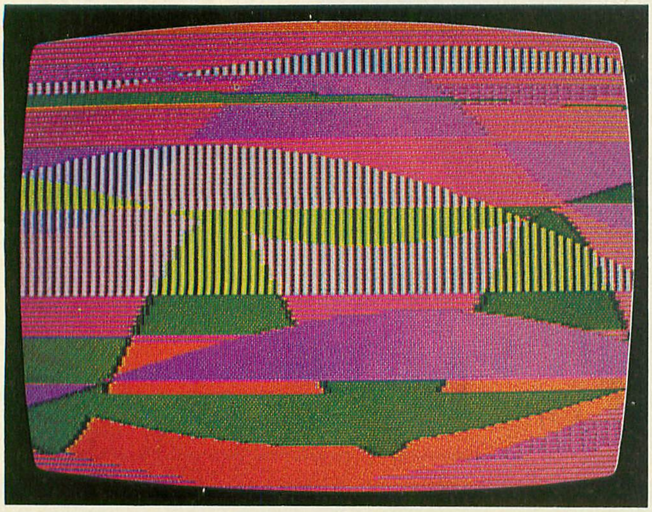
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MATH ART

ELEGANT DESIGNS FROM SIMPLE EQUATIONS

by MARIAN LORENZ and ALLAN MOOSE



Artistic Mathematics draws a variety of stunning and intricate patterns based on sine waves. Your designs can be printed on a dot matrix printer or saved to disk for use with Micro-Painter graphics software. This BASIC program works on 8-bit Atari computers with 32K memory and a disk drive.

To many, art interprets the beauty of nature while mathematics interprets nature's essence. What better place is there to join these concepts than your Atari keyboard?

Armed with a few equations, you can easily create an infinite variety of intriguing patterns and colorful designs. The Artistic Mathematics program lets you use the equations to plot colorful and intricate patterns on your screen. When you're done, you can print your pattern on a dot-matrix printer, or you can save your design on a disk and use it with Micro-Painter software.

Listings 1 and 2 show you how to use the sine function for drawing artistic patterns on the screen that resemble landscapes. Listing 1 plots sine curves of random color and size, Listing 2 lets you design your own sine curves. Both listings let you print your favorite patterns on Epson or Star printers, or save them to disk for use with Micro-Painter graphics software.

Type in Listing 1, MATHART1.BAS, checking it with TYPO II, and SAVE a copy before you RUN it. If you have trouble with the special characters in lines 46, 750 and 830, don't bother typing them in. Listing 3 will create them for you. When you RUN Listing 3, it creates a disk file called D:LINES.LST which contains the above lines. Now, type NEW, LOAD Listing 1 and ENTER "D:LINES.LST". You may also use D:LINES.LST with Listing 2, MATHART2.BAS. Remember to SAVE your completed programs before you RUN them.

THE MATHEMATICS

The sine function is ideal for generating many interesting and attractive curves. In fact, Fourier's Theorem states that *any* reasonable curve can be represented by the right combination of sine curves.

If you've never worked with sine curves before, they're pretty easy to understand. All sine curves are based on circles. Let's try this simple visualization exercise. Imagine a clock with a second hand that is one meter long.

continued on page 32

BE A HERO TO WINNIE THE POOH

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Last night the blustery wind came up and mixed up everything in the Hundred Acre Wood. If you can find the lost articles, like Pooh's honey pot and Eeyore's tail, and return them to their rightful owners, the characters in the Hundred Acre Wood will give a Hero Party in your honor!

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continued from page 30

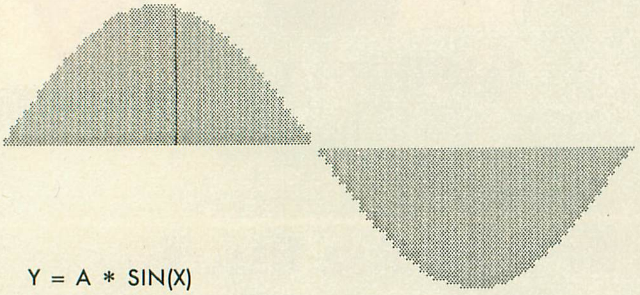
This clock has a horizontal red line drawn between the 3 and the 9.

Watch the tip of the second hand. When the second hand points to the 9, its tip lies on the red line. Five seconds later, the tip is 0.5 meters above the red line. Five more seconds and the second hand points to the 10—about 0.866 meters above our line. When the second hand points to the 12, it is at maximum height above the red line—one meter. As the second hand continues around the clock, the tip alternately rises above and falls below our line. If we graph this rising and falling, the result is a *sine curve.*

Figure 1 illustrates a basic sine curve. Here, A is the *amplitude* (height) of the curve. In our clock example, the amplitude was the second hand's maximum height above the red line—one meter.

The tip of the second hand circles the clock once each minute. Its *period* is equal to one. If we doubled the speed of the second hand, it would circle the clockface twice each minute, and its period would be equal to two cycles per minute.

Figure 1

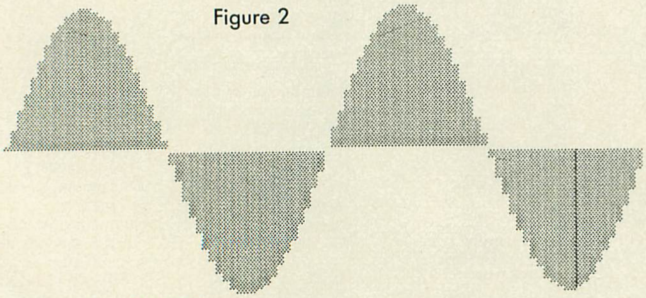


Y = A * SIN(X)

But since a sine curve is so closely related to circles and distances, periods are measured in cycles per 360 degrees (length), instead of cycles per minute (time). The sine curve in *Figure 1* has a period of one, while the sine curve in *Figure 2* has a period of two. Note that we merely multiplied X by two to get this curve. If we wanted a sine curve with a period of 100, we'd simply multiply X by 100 instead of two.

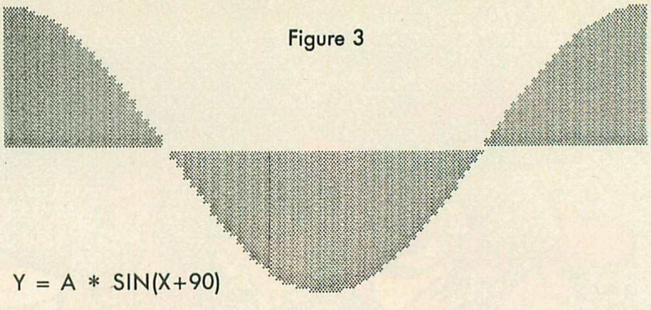
If we multiply X by 0.5, our curve would complete *one half* of a cycle in 360 degrees. Thus we can adjust the period, or length, of a cycle by multiplying or dividing X by some number.

Figure 2



Y = A * SIN(2X)

Figure 3



Y = A * SIN(X+90)

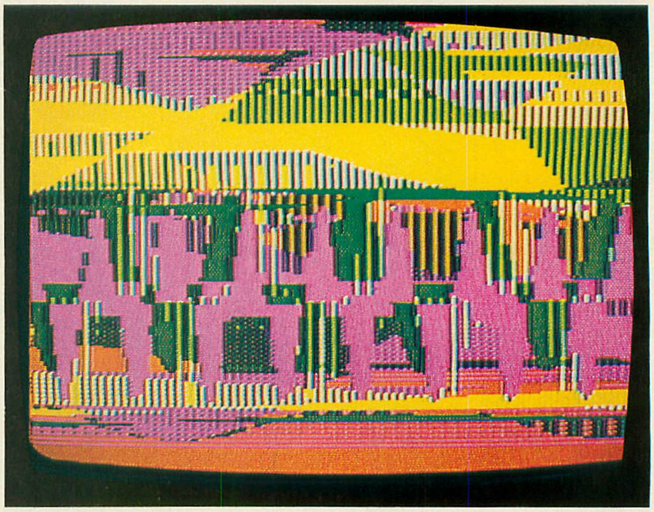
We can slide our curves left and right by adding and subtracting numbers to X. Adding numbers to X will shift the curve to the left (see *Figure 3*), and subtracting numbers will shift it right.

The angle added or subtracted is sometimes called the *phase angle.*

Notice that shifting the phase angle does not change the period or the amplitude. The shifted sine curve still completes one cycle in 360 degrees.

In summary, the fundamental ingredients for producing variety in the sine curve are:

- Amplitude (Height)
- Period (Length)
- Phase (Shifting the curve left or right)



THE PROGRAMS

Listing 1 uses a random number generator to vary the amplitude, period, phase angle, color and placement of the sine curves. The sense of depth and texture is due to the random overlapping of curves and lines. Listing 2 lets you choose values for all of these parameters.

Each time the program adds a curve to the screen, a window appears and asks you whether you want to [Q]uit the program, [P]rint the picture, [S]ave the picture in Micro-Painter format, or [C]ontinue adding curves to the screen.

"Pop-up" text windows are used when you want to add and remove text windows *without* erasing the graphics on the screen. To add a pop-up window, just add 32 to the BASIC graphics mode number when you make your GRAPHICS call. In Listings 1 and 2, the variable GM

represents this graphics mode number. (The statement GRAPHICS 7+32, for example, will add a pop-up text window to a Graphics 7 screen.) See line 355 in Listings 1 and 2 for more examples of this technique.

Similarly, we can remove the pop-up window by adding 42 to the mode number. See line 420 in Listings 1 and 2 for examples.

Happily, pop-up text windows can be used with many types of modified display lists. (Just remember to re-modify it after each GRAPHICS call.) Both Listing 1 and Listing 2 use a modified display list whenever they are RUN on a 400 or 800 series computer.

If you own a 400 or 800 series computer, you've probably gotten "cursor out-of-bounds" errors when using BASIC's PLOT and DRAWTO commands on a Graphics 7+ screen. We can solve that problem with two powerful machine-language USR routines.

The first machine-language routine (line 830) copies BASIC's PLOT and DRAWTO routines from ROM into RAM. Once in RAM, the routine deletes the instructions which perform BASIC's "out-of-bounds" checking. We use this modified routine in place of BASIC's PLOT and DRAWTO commands.

The USR routine in line 320 accesses our modified plotting routine, and is used in place of BASIC's PLOT and DRAWTO commands. In this line, X and AXIS are the starting (X,Y) coordinates of the line to be drawn, and X and Y are the ending coordinates.

Unfortunately, this routine does not work well with the XL-series Atari computers.

SAVING YOUR WORK

If you create a pattern you want to save, you can print it with the [P]rint option from the menu window. The screen dump routine (lines 400-730) is taken from the article by Jerry White and Fernando Herrera (**Antic**, January 1984). It has been modified to work with Epson, Gemini and Star dot-matrix printers.

You can also save your picture for use with Micro-Painter software. Just choose the [S]ave option from the menu window. Each picture requires 62 sectors of disk space. You can use the *Rapid Graphics Converter* (**Antic**, November 1985) to convert this picture into almost any other format.

Feel free to modify the equations in the program. You can mix and match sine curves to generate almost any mathematically defined curve. We leave it to you to explore many more of the possible combinations.

Marian Lorenz leads a pre-school program for handicapped children in Central Islip. Allan Moose is an associate professor of physics and mathematics at Southampton College. The two Long Islanders collaborated on a 6502 assembly language book which will be published shortly.

Listing on page 127

RECIPE CONVERTER

CALCULATES THOSE INGREDIENT CHANGES

by JAMES BROWN

Type a recipe into your Atari and Recipe Converter will calculate how much more of each ingredient you need for serving more people—or how much less you need for serving fewer people. Also converts decimal measurements to metric, and vice versa. The BASIC program will run on any Atari 8-bit computer with at least 48K and a disk drive.

It's time for a big family feast and 12 people are coming to dinner. But—oh no! Your favorite recipe makes only five servings and you need to scale it upward.

Only three of you will be home next weekend and that same recipe is now too big. You need to scale it down.

Or how about this? You just got a mouth-watering French cookbook for your birthday and you really want to try that Navarin Printanier—but all the ingredients are in metric! Just how many cups are there in a liter of heavy cream?

These everyday problems call for a lot of scratch paper and a heavy-duty pencil. Or . . . a computer.

TYPING IT IN

Type in Listing 1, RECIPE.BAS, check it with TYPO II and SAVE a copy before you RUN it.

Easier said than done, huh? Okay, this is a pretty long program listing, but at least it doesn't have many strange characters. If you're a newcomer, take your time. Don't try to get it done all in one sitting. And be sure that *every* TYPO II code matches. Be careful to type the DATA statements exactly as shown, including spaces in the REM statements in lines 210 to 255. Also, check to make sure you don't omit any program lines. TYPO II can't check for this.

KEEP IT FRIENDLY

In order to make Recipe Converter easy to use without digging out an instruction manual and decimal conversion table every time you run it, a lot of attention had to be paid to the user interface. (This is called friendly programming.)

For this reason, most of the program is dedicated to getting the information into the computer, and getting the results out. Only a small fraction of the code actually does any computational work. This is fairly typical of "practical" applications. You will find a lot of ideas in this program to help you write your own "user-friendly" applications.

Instructions for using the program appear on the screen as you need them. The screen border color and sound cues tell you whether the screen is waiting for input, or contains only instructions, or displays an error message.

USING THE PROGRAM

To use Recipe Converter you need a cookbook or other recipe source, a pencil and a sheet of paper. A printer is optional. You can save your recipes to disk and recall them later if you think you will need to "multiply" them again.

Recipe Converter can scale recipes up or down by any reasonable amount. However, some recipes don't work well when increased by a large amount, so be careful. Also, cooking times do not scale easily, so you will have to use your experience here.

Although all necessary instructions are in the program, let's step through an example. When the program is RUN, a colorful—and musical—title screen will appear followed by a screen describing the steps you will be going through to convert your recipe. After reading the screen, press [RETURN] to continue.

A second screen reminds you to search out all ingredients in your recipe—and, perhaps, label them with numbers. Press [RETURN] and you will be presented with your first

decision: Is your recipe in English or metric measurement? Or, maybe you previously saved a recipe to disk and now want to reload it. Those users who have never seen the program before can type [H] for a HELP screen which will explain how to tell the difference between English and metric. Like we said, this is a friendly program.

FRESH FRUIT

Okay, now that you've seen how friendly it is, let's zip through a recipe. We're going to take the following recipe for Fresh Fruit Salad, which serves six, and adjust it for 12 people. (We'll let *you* convert it to metric.) Some of the specific steps described below will make more sense once you actually have the program up and running.

FRESH FRUIT SALAD

2 peaches, skinned and pitted

1 small melon

3 apricots, pitted

1 3/4 cups strawberries

2 cups pitted cherries

2 Tbsp sugar

3 Tbsp orange juice

3 Tbsp lime juice

Press [E], for English measurements. Some instruction screens will show you what to do next. At the prompt, press [P] twice to enter 2 peaches. At the next screen, choose [P] again, for "piece", since a peach is a unit.

Now you may type in the description of the ingredient. In this case, type PEACHES [RETURN]. A verification screen will appear with **ingredient #1—2 piece of—PEACHES.** Sounds strange, but it's accurate.

All right, enter the rest of the ingredients in the same fashion. Our first three ingredients are units. When you get to the strawberries, choose cups. If you make a mistake entering, just press [N] when prompted. When all the ingredients are entered, press [Z].

We want to double our recipe, so we choose [M], then [P]. And let's look at it in English by choosing [E]. Each ingredient will be displayed on the screen, one at a time—both with the original count and the converted amount. If you don't have a printer, jot down the new amounts in your cookbook. (In some cases, an adjusted recipe may call for a fractional amount—such as 1 3/4 eggs. Just round this off, or use smaller eggs.) Notice when you get to the strawberries, you have a choice of equivalent cups, pints, quarts, and gallons. Choose whichever is more practical for you.

After you have stepped through the entire menu, a new screen will appear with several choices. Those with a printer can print a hard copy of the same information that earlier printed to screen. This might be a good opportunity to save your recipe to disk. (Don't forget to include D:.)

PROGRAM TAKE-APART

With the exception of a few short routines at the end, subroutines start at line numbers ending in 00 and end at line numbers ending in 99. The various portions of the program are:

100-142 Array declarations and definitions.

200-321 Data values for fractions, units, conversions, etc., plus note values for theme music.

1000-1099 Main program.

1100-1199 Initialization of arrays and constants. Line 60 disables the [BREAK] key (some people press it by accident because it is near the [RETURN] key).

1200-1299 Display the title page and play theme music.

1300-1399 Display introductory instructions.

1400-1499 Determine kind of input.

1500-1599 Determine amount to multiply recipe by.

1600-1699 Enter the ingredients for the recipe.

1700-1799 Enter the quantity for an ingredient.

1900-1999 Enter the units for an ingredient.

2100-2199 Display an ingredient.

2200-2299 Enter the name for an ingredient.

2500-2599 Choose metric or English units for output.

2600-2699 Display the converted recipe.

2700-2799 Display all reasonable combinations of quantity and units which are equivalent.

2800-2899 For English units, find the nearest fraction to the converted value. Approximations are used since cooking is not an exact science anyway. Decimals are traditionally used with metric units.

2900-2999 Ending menu.

3000-3999 Read a recipe from disk.

3100-3199 Print a recipe, including conversions.

3200-3299 Display a converted recipe.

3500-3599 Save a recipe to disk.

3700-3799 Check that all optional information, such as number of servings and a title, has been specified prior to printing or saving to disk.

4000-4099 Open a disk file.

7000-7099 Change an ingredient.

7100-7199 Enter an ingredient.

8000-8099 Assorted prompting routines.

8100-8199 Get a single letter and convert to upper case.

8200-8230 Extend a string with blanks.

8300-8399 Error handler for file open error.

Miscellaneous technical goodies:

INPUT #16,T$, in line 8014 waits for input *without* the "?" prompt.

POKE 702,64, in line 8110 is the same as pressing [SHIFT] [CAPS]. This insures all input is in capital letters.

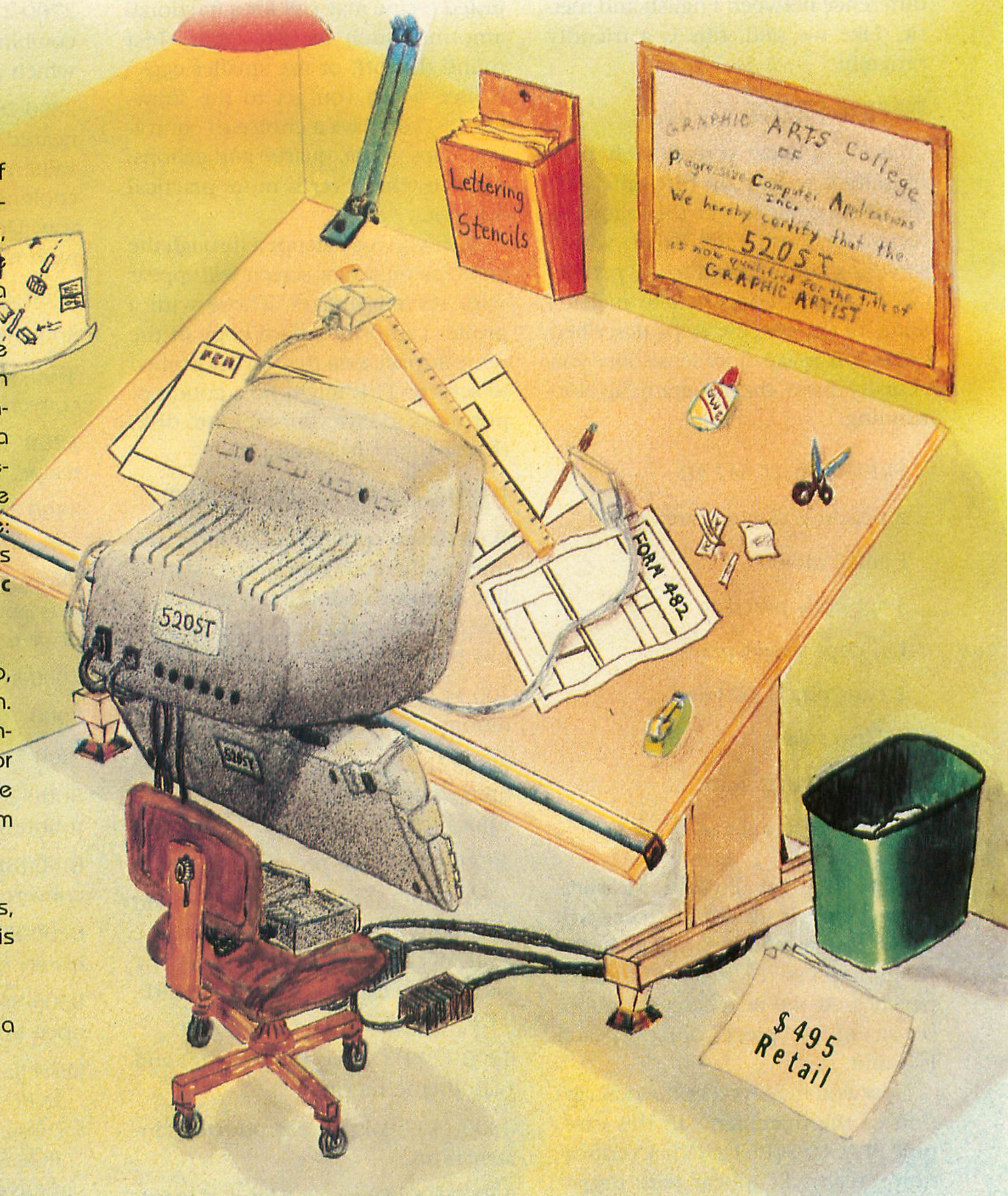
POKE 694,0, in line 8115 shuts off inverse, again, to insure uniform input.

James Brown is manager of the Computer Science and Applications Section of the Jet Propulsion Laboratory, California Institute of Technology in Pasadena.

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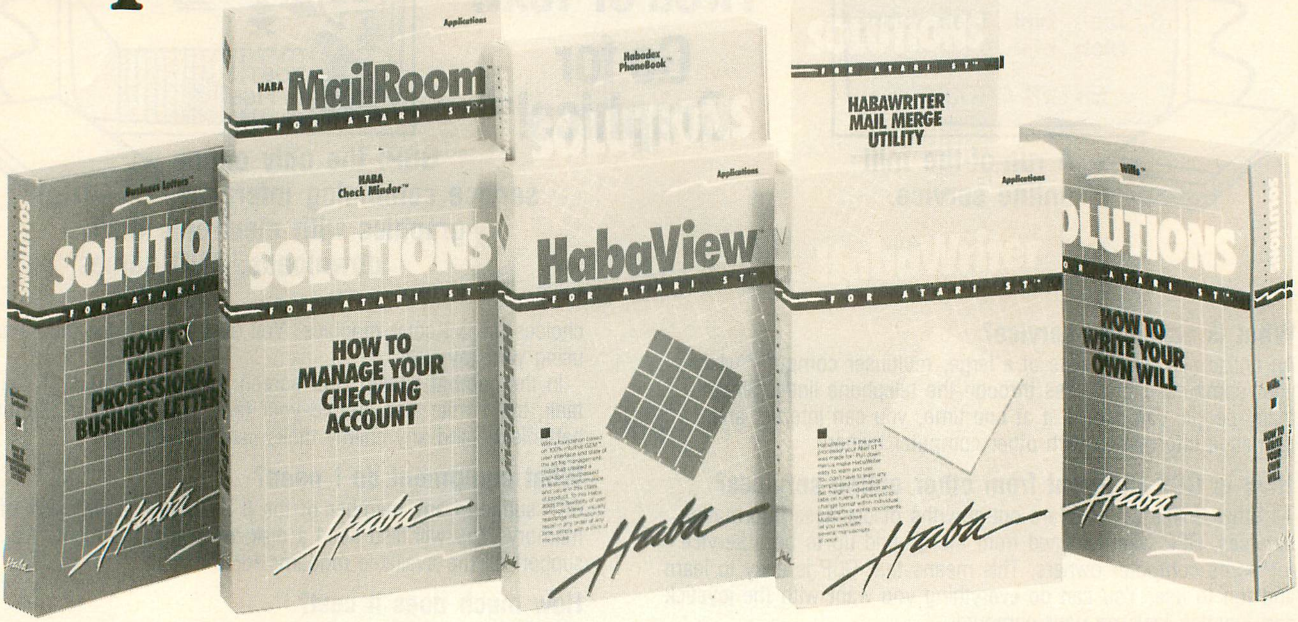
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MICRO JULIUS

PERPETUAL CALENDAR 1900-2100

by CHARLES POSTLE

Did you ever want to know how many days old you are? This computerized Julian perpetual calendar tells you exactly how many days ago a specific event happened. You can also see a screen display of any calendar month between March 1900 and February 2100. The BASIC program works on all Atari 8-bit computers of any memory size, with disk or cassette.

The Egyptian astronomer, Sosigenes, suggested to Julius Caesar in the year 46 BC that the calendar currently in use was a little out of step with the natural year. The natural year was actually 365.25 days long instead of 365. The solution, said Sosigenes, was to create a "leap" year every four years. And so it came to pass.

Some time later, it was discovered the 365.25-day year is just about 0.01 days too long. Rather than lose sleep over this, the great thinkers of the day brought our calendar up to date in the year 1900. It was felt that no more corrections would be needed until 2100.

Micro Julius is a computerized perpetual calendar with bells and whistles. It bases its calculations on the 365.25-day Julian Year. Since only dates between March 1, 1900 and February 28, 2100 can be figured using this method, there are limits to this program. (*Look for an update of Micro Julius in the February, 2100 issue of **Antic***—ANTIC ED)

USING IT

Type in Listing 1, JULIAN.BAS, check it with TYPO II and SAVE a copy before you RUN it. Micro Julius will first ask you for a date, in this order: Month, Day, Year. If, for example, you want to enter today's date as May 15, 1986, type: 5,15,1986 [RETURN].

The full date will be printed to the screen as May 15, 1986 THURSDAY. After a brief pause, a menu will appear with several options.

First, you may enter another date to find out the difference in days. Want to know how many days old you are? Let's say you were born October 5, 1959, Choose selection 1 and press [RETURN]. Type 10,5,1959 [RETURN]. If all is going well, you should discover that you are 9719 days old.

Selection 2 lets you subtract a number of days from the first date you entered. Exactly 250 days from May 15, 1986 was Saturday, September 7, 1985. Numerologists may wish to apply their magic numbers to this function.

Going on a 90-day diet? Well, if you start it on May 15, 1986, you can celebrate with a binge on Wednesday August 13. Use Selection 3 to add a number of days to your first date and mark the result on your calendar!

Selection 6 draws a page of the chosen month to the screen—labelling it appropriately and highlighting the given day.

JULIAN'S DAY

In programming, any math done with dates can be greatly simplified by first converting the date to what's known as a "Julian day number". This is the date, chronologically numbered from some known starting point. The conversion in Micro Julius takes place in lines 120 through line 170. This result-

continued on next page

ing number can now be treated like an integer in math problems.

Once the day number has been mathematically massaged, it can be reconverted back to a date again. Lines 180 through 270 do the reconversion. Note lines 130 through 150 and lines 220 through 270. Since the extra day in a leap year is added to the month of February, these lines distort the calender year to look as though it ends in February. Lines 290-310 figure the day of the week.

Menu Selection 1 allows a second date to be entered. This second date will be converted to a Julian day and the absolute values of the two days subtracted. The result is the number of days between the two dates. Line 650 performs this task.

Menu Selection 2 subtracts a number of days from the date first entered. Line 730 takes care of this, after which the program reconverts the result back to a new date in the subroutine at line 180.

Menu Selection 3 adds a number of days to the date (line 760) and again reconverts the result to a new date (line 180 subroutine again).

Selection 4 starts the program over so you can begin with a new date (line 780). Selection 5 ends the program.

ENTER GRAPHICS

To draw a calendar page (Selection 6), the program first finds out on what day of the week the month starts. This is done in lines 800-830. Then the program finds the Julian day number for the first day of the following month. Subtracting the two day numbers tells the program how many days are in the month in question. This is done in lines 850-890.

Lines 900-950 assign the days of the month to A$ string and make sure any previous assignments are blanked out. Lines 960-980 change the date to be highlighted into inverse video.

The C$ string is the actual calendar that will be printed. Lines 1040-1090 put the day-of-week symbols into the first week. These will be overwritten by any day of the month that falls coincidentally in the same space. Lines 1130-1150 match the days of the month (A$ string) to the calendar (C$ string).

The program is written to display the calendar page to the screen only (Lines 1160-1420). Printer output would be an interesting addition but, since printer graphics vary so widely, I leave this task to the reader.

I've tried to make the program as easy to use as possible. However, I might caution the reader that these calculations should not be used to figure financial interest and payments, because many banking institutions use a 30 day month and a 360 day year to calculate these matters.

Charles Postle is a construction superintendant in the Las Vegas area. He writes much of his own software in BASIC.

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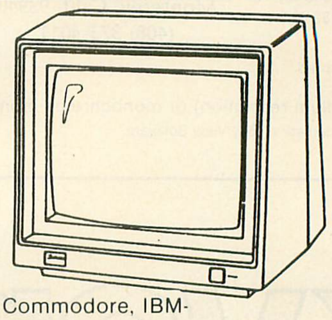
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BOMBSQUAD

AN EXPLOSIVE ADVENTURE

by PAUL TUPACZEWSKI

This challenging arcade/action game will push your joystick skills to the limit—there are ten levels to complete. (We never got past level two!) But we think you'll agree that the game's sophisticated programming features make it worth the effort. The BASIC program works on all 8-bit Atari computers with at least 32K cassette or 48K disk.

It's not just a job—it's an adventure. That's what they said when you enlisted in the Interplanetary Bomb Squad. Hah! The Bomb Squad is no adventure—it's suicide. You'll be lucky if you ever get off this frostbitten world to pick up your paycheck.

Detonator, your mission is to save a planet on the very precipice of extinction. Don't blow it! Put in your earplugs, strap on your jetpack and get ready for your noisiest assignment yet. Destroy those bombs before they destroy *you*.

BLAST OFF

Before slipping into that jetpack, you'll have to carefully type in Listing 1, BOMBSQU.BAS, check it with TYPO II and SAVE a copy. If you have trouble with the special characters in lines 25 and 1080, don't bother typing it in. Listing 2 will create those lines for you and put them in a file called LINES.LST. Now, type NEW, LOAD Listing 1 and ENTER "D:LINES.LST" (cassette owners type ENTER "C:"). Remember to SAVE your completed program before you RUN it.

When you RUN the program, it will take about 30 seconds to load before the red Bomb Squad logo rolls onto the screen. Plug in your joystick and press the trigger to begin.

You're stuck in an endless labyrinth of weapon storage facilities buried deep beneath the hard crust of planet Htrae. Did we tell you it's not a nice place? Red bombs rest on girders in the storage vault. Whirling robot guards are darting about, just waiting for you to drift into their path. Then there's Evil Eye—the rotating green thing that's constantly trying to run you down. And watch out for Puff, the red helium balloon. Puff is smiling, but don't let that fool you. Buggo, the white rabbit, moves left and right at random. Touch even one of these guys and you lose a life. Lose three lives and the Detonator gets blasted. Get blasted and you go back to the first room. Did we tell you this wasn't going to be easy?

If you typed in **Antic's** March, 1986 game of the month, you'll notice that the jetpack is controlled just like a Lunar Lander. Maneuver your jetpack by pushing the joystick in the direction you wish to go. You don't have downward thrusters, by the way. To land on one of the girders, you'll have to rely on the pull of gravity—what little of it there is on planet Htrae. And did we tell you about the green spires surrounding the border? Stay away—they'll just slow you down.

DON'T GET BOMBED

With all the advances in technology, by now someone should have invented an android that could take care of this. It's too blasted dangerous. Even for you, The Detonator. But only a human would have the agility to dart between the unflinching mechanical guards that haunt this place and then—gently, oh, so carefully—land on the holding platforms and defuse the bombs.

continued on next page

There's hope yet. Every once in a while, mysterious symbols appear. If you touch the Crystal, all enemies freeze in their tracks for a few precious seconds. Don't be foolish though, they're still deadly to the touch. Touch the Snowflake and the enemies freeze again. But this time when you touch them, you get 500 points and they get transported out of your path, to the top of the screen. Each time you touch the Sunburst, the point multiplier at the top of the screen is advanced by one.

Detonate every bomb on screen before the mechanical meanies get to you, and the computer multiplies the points by 100 times the number of bombs to tabulate your score. The number of bombs appears in the upper right hand corner.

So keep going. Fifteen bombs in the first room and who knows—how many more bombs? How many more rooms? We hear there may be ten. We hear that each room is more dangerous, that in some of those rooms, you only have one life. We also hear that your job may be opening up again, real soon, Detonator . . .

Paul Tupaczewski of Boonton, New Jersey is making his debut in Antic.

Listing on page 115

Antic welcomes program submissions from readers. Just send us your program and accompanying article, we'll pay you if we publish them.

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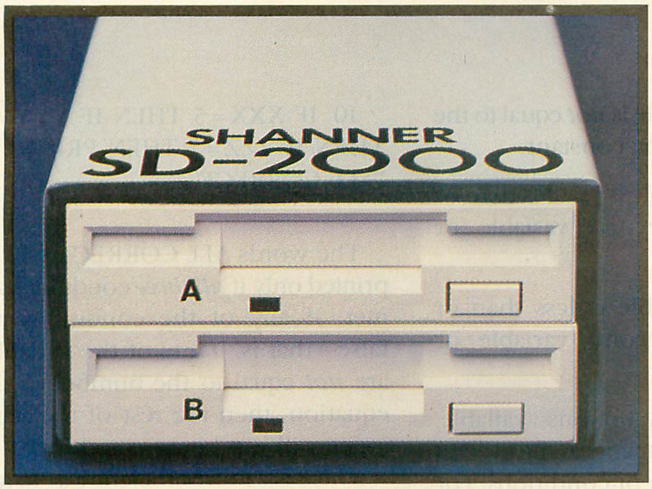
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NEW OWNERS COLUMN

Lesson 4: Nested Loops

by DAVID PLOTKIN

*Learn how to program BASIC on Atari 8-bit computers such as the 800XL and the 130XE. This new course for beginners started in our March, 1986 issue. Author David Plotkin, veteran **Antic** writer and programmer, is a chemical engineer.*

Last month, we explained how to use IF/THEN statements for making decisions, and how to use FOR/NEXT statements to execute loops. This month we are going to talk some more about these two sets of commands, as well as some commands for making IF/THEN and FOR/NEXT more flexible.

The IF/THEN statement is used to test IF a condition is true, and THEN take the appropriate action. We are not limited to just testing whether two variables are equal. A whole range of tests can be performed. You may test for the following conditions:

= Variables are equal to each other

< First variable is less than the second variable or constant

> First variable is greater than the second variable or constant

< > First variable is *not* equal to the second variable or constant.

>= First variable is greater than or equal to the second variable or constant

<= First variable is less than or equal to the second variable or constant

With this many options available, the IF/THEN statement can be used to test nearly any set of conditions. For example:

10 IF (XXX >=4) THEN . . . (greater than or equal to)

20 IF (XXX < > YYY) THEN . . . (not equal to)

30 IF (XXX < 1) THEN . . . (less than)

NESTING

Both the IF and the THEN must be contained within the *same* program line. But the IF/THEN statement can be **nested**. That is, an IF/THEN statement may contain another IF/THEN statement, up to the limit imposed by the length of the line:

```
10 IF XXX=5 THEN IF YYY=6
THEN IF ZZZ=7 THEN PRINT
"ALL CORRECT"
```

The words ALL CORRECT will be printed only if *all three* conditions are met. If any of the conditions are false—that is, if any of the variables are *not* equal to the number in the equation, then the rest of the statement will not be executed.

There is a more efficient way to test for multiple conditions than by using multiple IF/THEN statements—the AND and OR commands which were mentioned last month. The AND and OR commands will test multiple conditions, two at a time, to determine whether the combination of the conditions is true or false. For the AND statement, the result is true only if *both* statements are true:

AND "TRUTH TABLE"

Condition 1	Condition 2	Result
True	True	True
True	False	False
False	True	False
False	False	False

An example of using the AND statement in a program might be:

```
10 IF (XXX=5 AND YYY=6)
THEN PRINT "BOTH CORRECT"
```

The words BOTH CORRECT will print only if XXX=5 and YYY=6 (both are true). If either one is equal to something else (one is false), then the words will not be printed.

The OR statement works somewhat differently. The result is true if *either one* is true:

OR "TRUTH TABLE"

Condition 1	Condition 2	Result
True	True	True
True	False	True
False	True	True
False	False	False

An example of using OR might be:

```
10 IF (XXX=5 OR YYY=6)
THEN PRINT "ONE OR BOTH
ARE CORRECT"
```

The words ONE OR BOTH ARE CORRECT will print out *unless* neither variable is equal to the appropriate value. If either one is equal (one is true), then the statement will print out.

Although the AND and OR commands test conditions for true or false two at a time, they can be used to test more than two conditions. Take this example:

```
10 IF (XXX=5 AND YYY=6
AND ZZZ=8 AND BBB=9) THEN
PRINT "ALL CORRECT"
```

This line will be evaluated by first testing whether XXX=5 AND YYY=6. If the result is true (they are both equal), then the true result will be tested against the next condition (ZZZ=8). Each intermediate result is used as one of the two conditions to test with the next condition.

Clearly, in this example, any of the statements being false will lead the whole equation to be false and the words will not be printed. AND and OR can be combined in the same statement. Again the conditions are evaluated two by two, with each intermediate result used to evaluate the next condition. Assuming that XXX=5, YYY=6 and ZZZ=7:

```
10 IF (XXX=5 OR YYY=7)
AND (YYY=8 OR ZZZ=7) THEN
PRINT "WHAT A TEST!"
```

This statement evaluates as true, and the words are printed. XXX is equal to 5, so the first combination (XXX=5 OR YYY=7) is true. ZZZ is equal to 7, so the second combination (YYY=8 OR ZZZ=7) is also true. ANDing the two true conditions together (TRUE AND TRUE) is also true. The use of AND and OR is a very powerful tool in making program decisions, so you should be comfortable with their use. If you aren't too sure that you can determine when a statement is true or false, check this month's type-in program for a quiz of whether various complex program statements are true or false.

The final command that is useful in making decisions in a program is NOT. The NOT command takes the opposite of of an evaluation's result. That is, if a statement evaluates as true, then NOT will evaluate the statement as false:

```
10 IF NOT (XXX>1 AND
YYY=3) THEN . . .
```

If XXX=2 and YYY=3, so that the statement (XXX>1 AND YYY=3) is true, then the above line will not execute the part of the statement after "THEN" because NOT takes the true statement and makes it false.

FOR/NEXT NESTING

Last month I explained FOR/NEXT loops. There will be times when you want to change two or more variables at the same time. One way to do this is to **nest** two or more FOR/NEXT loops—place one loop inside another:

```
10 FOR LOOP1=100 TO 200
20 FOR LOOP2=15 TO 4 STEP -1
30 SOUND 0,LOOP1,10,LOOP2
40 NEXT LOOP2
50 NEXT LOOP1
```

This example will play a type of whistle on your Atari. Let's see how this works. Line 10 initializes the first loop variable (LOOP1). Line 20 initializes the second loop variable (LOOP2). Line 30 plays the sound, using the values of LOOP1 and LOOP2 as parameters. Line 40 represents the termination of the LOOP2 loop. Finally, line 50 terminates the LOOP1 loop.

There are some important things to notice about this example. When nesting, each inner loop must reside entirely within an outer loop. In this case, the inner loop (LOOP2) starts and ends within the outer loop (LOOP1). Each time the outer loop executes once, the inner loop executes through the entire range of the variable specified in the FOR statement.

If an inner loop is not contained entirely within an outer loop, an error will result. This can happen accidentally in a program when you are doing a lot of jumping around. (GOTOs will be discussed in a future column.) When you use nested loops, you have to be careful about what occurs in the inner loop. For example, if your inner loop *modifies* the variable used in the outer loop, you may exit before you want to, or you may never exit at all:

```
10 FOR LOOP1=0 TO 10
20 FOR LOOP2=100 TO 200:
LOOP1=0:NEXT LOOP2
30 NEXT LOOP1
```

continued on next page

This program will run forever (or until you press the [BREAK] key) because the inner loop is setting LOOP1 equal to zero each time it is executed. The outer loop will increment LOOP1 to 1, but it will never reach 10. This illustrates that special care must be taken when you are programming nested loops.

FOR/NEXT LOOP EXITS

Some of the programming commands to be covered in future columns will tell you how to jump from one program line to another during the run of the program. Obviously, such commands could be used to jump out of a FOR/NEXT loop before the variable has reached its limiting value:

```
10 FOR LOOP=1 TO 10
20 GOTO 40:REM (sends the program to line 40, skipping line 30)
30 NEXT LOOP
40 REM Pick up here
```

This is *bad* programming practice! If you leave a loop without completing it and executing the NEXT statement, your computer will not know that the loop is finished. The part of memory in your computer which keeps track of NEXT statements will gradually fill up with uncompleted NEXT statements, eventually leading to an OUT OF MEMORY error. This can happen even though you have plenty of regular memory left. There is a much better way to exit a loop without going through it as many times as the FOR statement specifies. Have the statements in the loop modify the loop variable so that it is outside the range specified in the FOR statement:

```
10 FOR LOOP=1 TO 10
20 PRINT LOOP:IF LOOP>5 THEN LOOP=11
30 NEXT LOOP
```

This set of statements will execute until LOOP=6. Then the IF/THEN statement in line 20 takes over and makes LOOP=11, which is outside the range specified in line 10. Since LOOP is outside the range, the program will exit the loop and "fall through" to the program line following the NEXT

LOOP statement. This method of properly exiting a loop cleans up your computer memory and doesn't lead to the problem discussed earlier.

THE LISTING

This month's listing tests whether you understand how to combine AND, OR and NOT for setting up decisions in IF/THEN statements. Type in the listing, NEWOWN4.BAS and SAVE a copy before you RUN it, following the instructions from previous lessons.

A statement will be printed on the screen, and you will enter T or F for True or False. If you get many of the answers wrong, I suggest you re-read the sections of this column dealing with this subject, because the concept of Test/Decision in the IF/THEN statement is very important to your success as a programmer.

Atari programming beginners will find additional details about topics covered by this series in Lon Poole's fine introductory book, ***Your Atari Computer****, $17.95 from Osborne/McGraw-Hill Publishing, Berkeley, CA.*—ANTIC ED

Listing on page 114

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ATARI LEARNING CENTER

'The best educational machine'

by GIGI BISSON, **Antic** Assistant Editor

"The Atari is the best educational machine around, there's no doubt in my mind," Robert Hashway says.

Hashway can say this with confidence—he has the statistics to back it up. He first discovered the Atari while working on instructional development of programs in institutional research and statistical analysis for Massachusetts State University. When he completed research studies on computers in education for MSU in 1981, the Atari 800 computer came out on top.

Hashway discovered that the features built into the Atari to run entertainment software—clear graphics and sound, smooth vertical and horizontal scrolling—also make it an excellent computer for running educational software. He's been cheerleading for Atari computers ever since.

His gung-ho Atari optimism might be difficult for skeptics to swallow if Hashway's credentials weren't so impeccable. A PhD and distinguished educator, "I'm mentioned in *Who's Who* and all that other stuff," he says, Hashway has an extensive background in computer education, mathematics and statistical research. And he has daily proof to back up those statistics. He runs the Advanced Concepts Learning Center in West Warwick, Rhode Island, an educational institution that uses Atari XL/XE and ST computers exclusively.

After becoming a confirmed Atari believer, Hashway formed the Rhode Island Atari Users Group. During users group meetings, he saw a desperate need for computer education to train teachers in effective classroom use. He started the Advanced Concepts Learning Center, and in three years it has grown from a computer curriculum class for teachers, to a full-fledged educational institution, computer store, and consulting business.

Teachers now learn the latest techniques of computer-managed learning systems and how to develop customized computer courses. Classes are available for all ages and experience levels ranging from "Computer Movies" for kids, to "Business Finance Systems" for adults.

NOVICE TO EXPERT

The Learning Center devotes most of its time to educating computer novices. "We're talking about people who don't even know what a modem is," he says. "We're addressing the primary question of 'What is a computer and how do I use it?'"

The Learning Center is now going way beyond beginner-level instruction. There is a class that trains teachers in techniques of course design and computer aided research, using MicroTeach by DynaComp. Math teachers are learning to manage classroom instruction with a math system for the Atari by 3R. Teenagers are learning BASIC programming, word processing with AtariWriter, fundamentals of databases with SynFile+ and spreadsheets with SynCalc. The most popular course for adults leads to a certificate in financial systems analysis and inventory control.

Atari ST computers are used for instructing teachers how to do graphics. Students learn the basics of professional ST office systems with the VIP Planner spreadsheet, DB Master database, 1ST-Word word processor, and Cash Flow, a $99 accounting package which Hashway designed himself.

Hashway is now starting to do outside training in industries. The Atari 800 has been put to work at a chemical laboratory, and ST computers are assisting in the design of intricate lacework patterns for textile mills.

And yes, there's a summer camp too, where kids make posters with Broderbund's Print Shop, learn keyboarding skills on Touch Typer, draw graphics with touch tablets and make animated cartooons with Electronic Arts' Movie Maker.

The Learning Center slogan is "Learning is our most important product," and Hashway lives by it. "The problem is not teaching *how* to use software or hardware, it's learning *what* to use it for," he says. "In the education field, we need to learn anal-

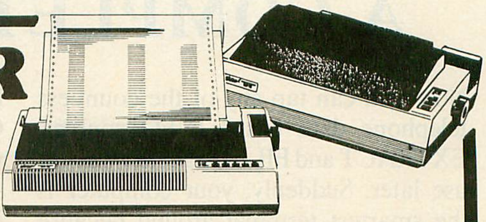
ysis and synthesis. Teachers have never had the power of the computer available before. They've never had to deal with these concerns."

Hashway is convinced that what-if modeling with spreadsheets and database research will be the essential office skills of the 1990s, the way typing and filing are today.

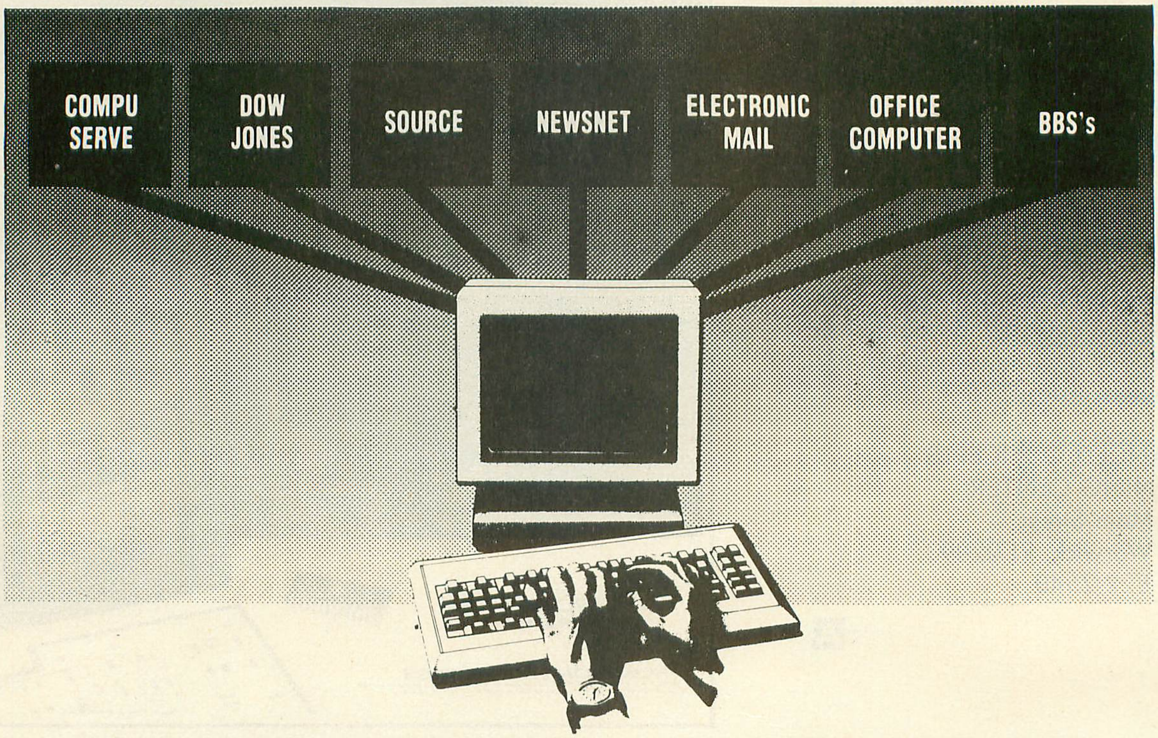
"I don't see anybody using file cabinets at the end of the decade," he predicts. Will workers be using Atari computers instead? He hopes so.

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product reviews

MIDI MUSIC SYSTEM

Synthetic Software
189 Duncan Street
San Francisco, CA 94110
(Requires Hybrid Arts MIDIMATE Interface)
$69.95, 48K disk

Reviewed by Gary Yost

First there was Advanced Music System (AMS) by Lee Actor, an old APX favorite. AMS II was an upgraded version released in 1983. Now, everybody wants MIDI software. Yet for hobbyists who cannot perform well enough to use sequencers and MIDI recorders, or for professionals interested in arranging and composition—how do we control our synthesizers? The answer is the MIDI Music System (MMS) written by Lee Actor of Synthetic Software.

The sophistication of MMS goes far beyond Actor's earlier programs. The MIDI Music System is an interactive music editor (or "step-editor" in MIDI parlance) with a word processor style of editing—scroll through data, insert, delete, cut and paste. I found it very easy to use. All selections of MMS are accessed from the Main Menu. These 12 selections include playing and editing music, MIDI channel assignment and mode commands, tempo, disk I/O and a directory. One other useful item is online Help, which describes in detail each of the other selections. I found this a valuable aid in learning the Music Editor commands.

For those of you familiar with AMS, the musical notation is similar. It has also been compared with "Page R" of the Fairlight Computer Musical Instrument (CMI). A note is specified by a letter name, an octave number, and a duration. For example, C4Q is a C, fourth octave, quarter note. This notation is easy to learn—once I got the hang of it, I could really fly.

This software has so many powerful features, that I can only begin to list some of them:

Pitch values can be entered directly from your MIDI synthesizer. I found this especially useful when entering sheet music.

Tempo control is remarkable. One method of control allows tempo continuously changing at a fixed rate!

Velocity, Pitch Wheel, and MIDI Clock are all well supported. Pitch Wheel commands take up only three bytes!

Jump commands allow easy and efficient use of frequently used phrases. This really helped me when entering a repetitive note or first and second endings.

Repeat loops simplify the entering of repetitive lines. Boy, is this a timesaver.

MMS contains 99 Voices (or monophonic tracks), of which 20 "Channel Voices" can be assigned to any of 16 MIDI channels. The remaining voices are "Phrase Voices" referenced in Jump commands. I could write a 20-voice composition while using the other voices for phrases, recurring themes, or the same part used by more than one voice. This feature in conjunction with Repeat loops makes note capacity seem infinite.

The Music Editor displays three voices simultaneously. Moving through your music is extremely fast and easy. Scroll through a single voice by single note, by measure, or specify the measure desired. Scroll across voices or select the voice desired. The ease with which I could move through the music adds to the professionalism of this program.

The manual is well written and although it lacks an index, the table of contents is detailed. AMS users will probably get started immediately with only the aid of online Help.

My only criticism is the absence of a "sync in" capability. This is mostly an issue for professional musicians who would like to make multi-track recordings. Also there is no Play Through feature.

We contacted Synthetic Software on this matter. If there is interest, they will add these capabilities in a future update.

One final note: MMS comes with an AMS to MMS conversion program. It converts AMS I to AMS II files and both AMS I and AMS II to MMS files. For AMS users gone MIDI, this product is a "must have!" In summary, MMS is easy to use, very powerful and appears to be bug-free. I highly recommend it for anybody interested in controlling MIDI synthesizers with their Atari 8-bit computer.

NAM

Strategic Simulations Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 21030
(415) 964-1983
$39.95, 48K disk

Reviewed by Rich Moore

No matter what people at home called it, the Vietnam "conflict" was a real war to the men who fought there. The enemy was trained, well-armed and highly skilled in using his home terrain to either seize the initiative or check U.S./Allied momentum. SSI's excellent new tactical simulation, **NAM**, pits one player against a computer as wily as the Viet Cong and North Vietnam army units it simulates. All the action takes place at the squad level with a terrain resolution of 50 meters. Vigilance and survival are paramount.

The six basic scenarios each have both historical and optional starting positions to give 12 unique situations representing the major types of ground engagements in Southeast Asia. Three levels of difficulty allow players from beginner to expert to enjoy satisfying games. Play proceeds in turns which incorporate battlefield observation, artillery fire/air strikes, enemy fire and movement, friendly fire and movement, overall tactical as-

sessment and an opportunity to save the game.

The first of the six well-designed situations is appropriately the ambush of a truck convoy. You earn extra points for getting the trucks out of "harm's way", apparently impossible (10 out of 10 tries, anyway) in the historical setup, since the VC/NVA units always shoot first and always go for the trucks in their opening volleys of fire. The other scenarios all seem manageable with either set of starting positions—depending upon how you use your forces, of course!

Besides the truck ambush, NAM provides a firebase skirmish, a large-scale helicopter assault, a clearing operation in an area honeycombed with caves, the single U.S./NVA armor engagement and the urban battle to retake the city of Hue.

Familiarity with Southeast Asia operations is an asset, but not a requirement. The well-written manual clearly states how to load the game and execute all 11 phases of play. The scenarios are described in concise terms along with any special rules that apply. Key points regarding terrain, the types of forces and their deployment are emphasized and deserve extra attention to be successful. Some lessons, such as routinely digging in, force mobility, helicopter firepower and the judicious use of artillery are driven home in the game much more effectively than in the manual.

The multi-colored graphics are excellent. Icons representing the combat units are easily interpreted. The terrain features are the best I've seen in a war game—dense jungle, rough and open ground, hills, roads, caves, buildings, rivers, bridges and walls are all colorful and well-defined. The player's view scrolls smoothly over a playfield almost twice the dimensions of the screen. Virtually all input to the simulation is via a joystick and cursor with the commands a natural part of each phase in a turn.

NAM is fun and a challenging simulation of combat with enough variety to make it enjoyable for a long time. Moderately addictive, it tempts you to play "just one more turn" before dinner/bed/dawn/finishing this review. Speaking of which, I've got to go back and finish clearing out those caves.

SOUNDMOUSE

Soundsoft, Inc.
P.O. Box 740, 10 Maple Avenue
Andover, NJ 07821
(201) 786-6060
$39.95, 48K disk

Reviewed by Charles Cherry

Now here is a fun item. The **SoundMouse** is not really a mouse, although it looks like one. It's a sound-activated controller. The little box plugs into the joystick port and listens, particularly for low pitched sounds. It continuously translates the sound volume into a value for the paddle register. Simple and effective.

Once the result is in the computer, software can do anything with it. Since the sound can come from anywhere, the possibilities are limitless: games that work with a shout, a clap or a footstomp; an unusual random number generator; an applause meter; an event counter; a burgler alarm; or, of course, a music-driven light show.

Although the SoundMouse works through the paddle register, an assembly language programmer could write a little routine to feed the data into the joystick register. Such a routine could allow you to use the SoundMouse as the joystick trigger with some commercial games. You could steer with the joystick and shoot by yelling FIRE!.

A sensitivity control (the only moving part) lets the SoundMouse respond to a wide range of noises. This makes it suitable for an equally wide range of applications. Although the manual says the SoundMouse responds to the volume of the sound, experimentation showed that it really responds to the *change* in volume.

For example, a constant sound returns a level of about 105, no matter how loud it is. If the volume drops, the number decreases. But if the volume drops and stays constant at a lower level, the value will drop and then rise back to 105. This makes it relatively immune to constant background noises.

Normally a hardware device like this is for people who can utilize it in their programming. But the SoundMouse comes with some demo programs which are spectacular. The light shows alone are worth the price of admission. There are also some examples of games and other uses for the SoundMouse, including an animated three-piece band which will play along with your stereo.

The SoundMouse is well designed and well constructed. It is a unique product with many potential uses, at a reasonable cost. And it is a lot of fun.

GRADESCAN

C. Robert Blum
1722 Golden Court
Crofton, MD 2114
$29.95, 48K disk

Reviewed by Stephen Roquemore

Gradescan is a teachers' application program for tracking students, classes, and grades. It is menu-driven and easy to use. The term "user-friendly" has been beaten to death, but it really applies to this software.

The program uses only one disk drive, even if you have more. The manual is clear and easy to understand, although it is not at all fancy. It is simply a stapled-together printout of a text file, with a title page apparently done by Broderbund's Print Shop.

However, after starting up the software you really don't need a manual.

continued on next page

The menu choices are successfully designed to make using the program intuitive. The Main Menu presents you with 11 choices, arranged in the order of most to least usage. They are: Retrieve Data from Disk, Create New Class, Enter Grades, Examine Averages, Examine Grades, Examine Class Averages, Correct or Revise Records, Add/Delete Student Names, Store Data on Disk, Print Reports and End Program.

When starting fresh, you need a blank, formatted disk for your class data. Atari BASIC is required. You start with Selection 2. After creating your class files, you use Selection 8 to add the students to the class. As the term progresses you use Selection 3 to enter the grades.

The program comes with a "demo" disk to help you get used to the program before you enter your own data. It is really helpful in learning the program! The author stresses strongly that you should not store data on the program disk, nor should you write DOS files to the data disk. The program is copyable, it comes with DOS 2.5 in single density and you do NOT need an Atari 1050 disk drive to run it.

If you are a busy teacher looking for an easy-to-use program to help you with your classroom record-keeping, then Gradescan is the one for you. I highly recommend it to all teachers.

SPELLBREAKER

Infocom
125 Cambridge Park Drive
Cambridge, MA 02140
(617) 492-6000
48K disk (also available for ST)
$49.95

Reviewed by Harvey Bernstein

Calling all Infocom freaks . . . Did you zip through Zork? Were you able to hurry through the Hitchhikers' Guide? Was Planetfall a mere problem-solving pitstop? Have I got a challenge for you! **Spellbreaker**, the third game in the Enchanter/Sorcerer Trilogy, has been released. And I found it to be the toughest, most frustrating Infocom game yet. Three weeks of (practically) sleepless nights and I'm still little more than one-third of the way through. The problem is, not only is the game damn hard, it is also as well-written and as much fun as any previous Infocom text adventure.

Starting where Sorcerer left off, you are once again a full-fledged member of the Circle of Enchanters. But there is a crisis in the land! Everything is going to pieces (literally and figuratively) and now magic itself is starting to fail. During an emergency meeting of the Circle, you notice your comrades starting to turn a little green about the gills. In fact, a couple even croak (sorry). Anyway, only you are left to follow a mysterious stranger who promptly vanishes, leaving a strange white cube behind. Learning what to do with the cube is essential, as it is the key to the heart of Spellbreaker. In fact, along the way you will find a number of like cubes, each of which takes you to a "mini-adventure" that must be solved—much the same as the Infnite Improbability Drive in Hitchhiker.

In fact, untangling the gordian knot of cubes-within-cubes-within-cubes is what makes Spellbreaker such a challenge. All the cubes contain *very* difficult problems, most of which require objects found in other cubes! The game was written by Dave Lebling, co-creator of the original Zork, and in many ways is reminiscent of the original Infocom style. The problems are of the old-fashioned locked-door variety, which are solved by object manipulation or (as in the other games in this series) the use of magic. Character interaction is minimal. I've lately come to think of Spellbreaker as Zork IV. The only thing I miss is Infocom's sometimes wry sense of humor.

The one aspect of the game I disliked had to do with the sub-plot of failing magic. Often, when casting a spell, it doesn't work. That doesn't mean that it was the wrong spell. Instead, you have to try again. And again. Since failure seemed to be a random event, there were times that I had to learn and cast the same spell as many as seven times in a row. That can get a little tedious. Owners of early versions should be aware of a bug in the program. At one point you will be in a room, the only exit being a hole plugged with a piece of alabaster. Don't rezrov the hole (even though you can). You still won't be able to use the exit. You must rezrov the *plug* in order to leave. Supposedly, later versions have corrected this.

Spellbreaker is rated Expert, and that is one of the greatest understatements of the year. It is an excellent game, with plot and developments that rank with Infocom's best. It will no doubt be much too difficult for most adventurers, and it may be worth your while to send for the hintbook as soon as you buy this game.

BATTALION COMMANDER

Strategic Simulations Inc.
883 Stierlin Road, Bldg. A-200
Mountain View, CA 94043
(415) 964-1200
$39.95, 48K disk

Reviewed by Dr. John Stanoch

Armored fighting tactics have changed greatly since the end of the World War II. With SSI's **Battalion Commander**, a player can explore the tactics and strategies of the '80s battlefield.

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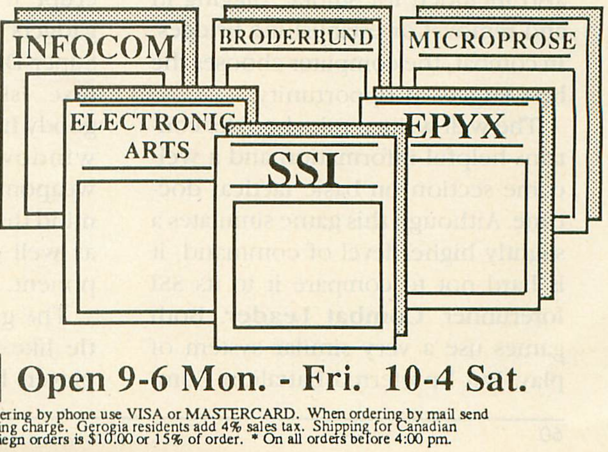
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ment, attack, or defense. In every scenario except the novice, the player can choose from American, Russian and Chinese nationalities and determine the strength of both opposing forces.

Select a battlefield from a list of 40 different terrain maps. The screen cursor responds well to the joystick and smoothly scrolls across multiple horizontal and vertical screens. The coordinates of each screen are displayed at the top and the left. When the screen is scrolled horizontally, the top values change, When the screen is scrolled up or down, the left values change. With this system, the player can immediately see the exact locations of both his own units and any visible enemies.

Combat units are shown as silhouettes depicting a tank for armored units, a truck for truck mounted units, an infantryman for dismounted troops, or two offset rectangles for platoons mounted in personnel carriers. Each figure represents one platoon. Other silhouettes show burning vehicles, objective locations, artillery batteries and supply depots.

A combination of joystick and keyboard commands control the gamut of important battlefield orders. Units can be ordered to a specific location by accessing the platoon or company, followed by placing the cursor at the location and pressing the letter "G" for "Go to." Fire commands include orders for normal, suppressive and priority fire. Special commands are also included for smoke, digging in and removal or establishing bridges. In combat, the computer chooses the best targets of opportunity.

The well-written rules booklet contains helpful information and a welcome section on basic tactical doctrine. Although this game simulates a slightly higher level of command, it is hard not to compare it to its SSI forerunner, **Combat Leader**. Both games use a very similar system of play. But I preferred Battalion Commander because of its better mapboard, improved unit graphics and greater selection of commands.

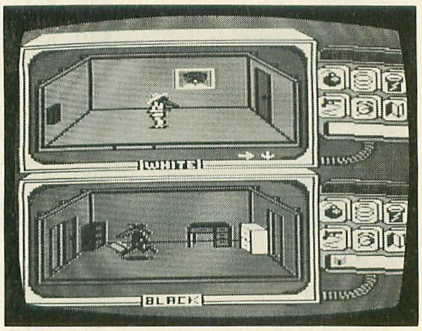
SPY VS. SPY II

First Star Software
22 E. 41 Street
New York, NY 10017
(212) 532-4666
$29.95, 48K disk

Reviewed by Brad Kershaw

Spy vs. Spy II, The Island Caper brings back the rival Black Spy and White Spy from MAD Magazine in their second computer game.

This time, the object is to parachute onto a tropical island and find three missile parts that have been buried in different locations. You must assemble the parts and find your offshore submarine before time runs out.



Each spy is equipped with several traps that are capable of ending the other's search quickly and permanently. There are also natural hazards, such as an active volcano waiting to erupt if you run out of time. All gadgets are accessed through the Super-Duper All-In-One Handy Deluxe Island Trapulator. This little goody has everything from a spy map window to some really nasty weapons. However, you must keep in mind that traps you set will work just as well on yourself as on your opponent.

The game screen itself looks a little like the first Spy vs. Spy. Both players have their own independent half-screen showing exactly what mischief they are up to. This also allows both players to be on separate parts of the island and see what the other is planning.

The sandy island is dotted with bumps indicating where things are buried. There may be parts of the missile buried under the sand, or a trap waiting to get you, or more ammunition to use against your opponent. You won't know what is lying in wait until you dig.

You can choose one or two players, level of difficulty, and the IQ of the computer opponent. On each spy's screen is a Strength Meter that shows which parts of the missile have been accumulated, along with a digital timer and the various traps your spy has set. Naturally, the strength meter also shows how much strength you have left. Every time you fall prey to a trap or battle against your rival you lose some strength and can ultimately perish. It's true that you can regain strength by doing nothing. But that's no help when you are racing against the clock.

Once you have avoided the traps and found the three pieces of the missile, you still have not won. You must swim out and find your submarine. This would be fairly simple if not for the sharks. If you do find your sub and manage to swim out to it, you are rewarded. The hatch opens and a beautiful woman pops out to kiss you. You promptly enter the sub and sail away with her.

I thought this game was considerably better than the first Spy vs. Spy. The traps were easier to set, the hand-to-hand combat seemed easier to control. The volcano scene, the parachute scene and opening screens include some of the best animation I have seen since Ballblazer. Unlike certain movie sequels around today, this game is not a rehash. In fact, you will probably see me standing in line for Spy vs. Spy III.

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(entertainment software)
Polarware/Penguin Software
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The Comprehend Interactive Novel Series—already a hit on the Apple, Atari 520ST and other computers—now comes to the 8-bit Ataris. Other titles in this graphic adventure game series include **The Quest, Coveted Mirror, Oo-Topos, and Frank & Ernest's Adventure.**

SCREENS

(utility software)
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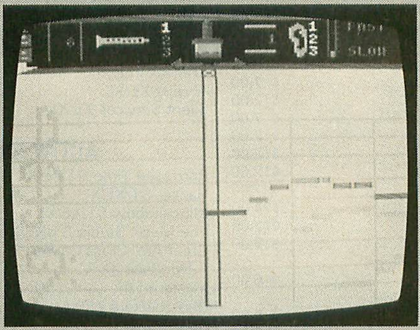
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A new version of the popular **PaperClip** word processor, featuring the **SpellPack** 30,000-word spelling checker, has been released for the Atari 130XE. The spelling checker is resident in RAM for speedy access.



SILENT BUTLER, MUSIC PAINTER

(software)
1196 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000
48K disk

Silent Butler ($24.95) is a complete personal finance program that features check printing. **Music Painter** ($19.95) is a real-time musical composition program that paints notes on the screen in color.

ADVAN BASIC UPDATES

(utility software)
Advan Language Designs
P.O. Box 159
Baldwin, Kansas 66006
(913) 594-3420
48K disk

Advan has two new enhancement utilities for their BASIC Compiler which was reviewed in the April, 1986 **Antic**. **Utility Programs** ($29.95) includes the much-needed runtime module. It also has variable cross referencing and renumbering, as well as new BASIC keywords to call DOS functions, convert numbers from one base to another, and perform matrix mathematics.

Screen Design ($29.95) helps create complex graphic screens. It does custom display lists, using all 16 text and graphics modes, horizontal and vertical smooth scrolling, and custom character sets. It includes PLOT and LOCATE commands which also work on mixed mode screens. The package includes a sophisticated drawing program and a character set editor. Screens created here can be used in Advan BASIC programs with the LSCREEN command.

The latest version of the highly rated Advan BASIC Compiler ($49.95) now includes a conversion utility to translate "many, but by no means all" Atari BASIC programs into Advan BASIC. It also has new commands to set the system default to real (floating point) or integer numbers and is now recommended for 48K Atari 400/800 as well as the XL/XE.

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(memory upgrade)
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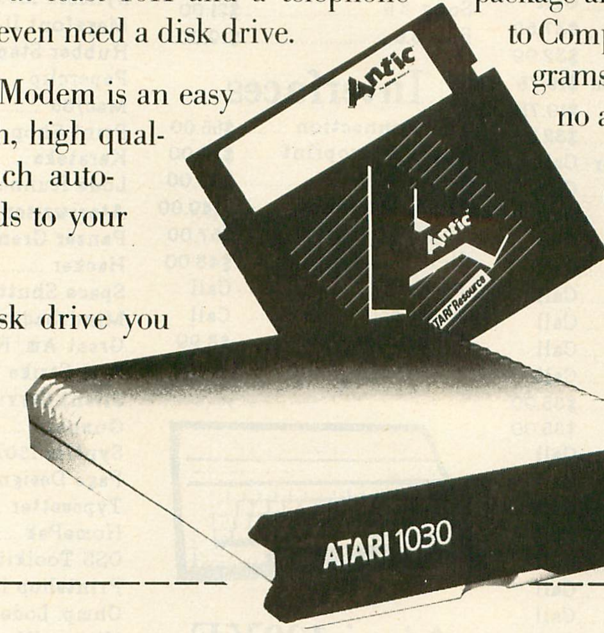
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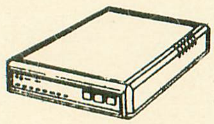
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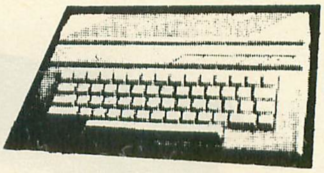
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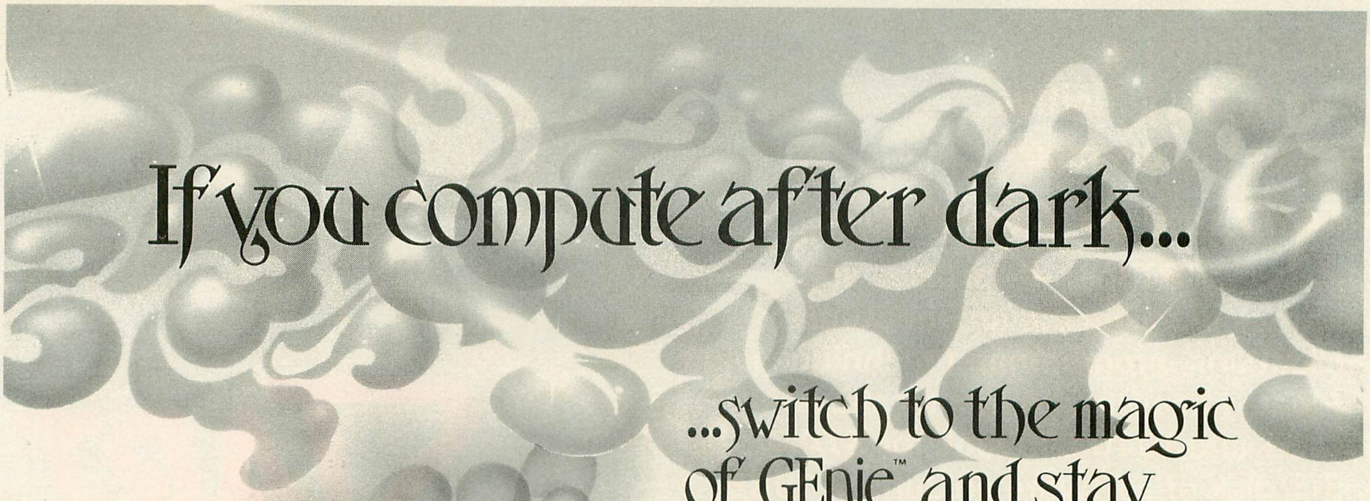
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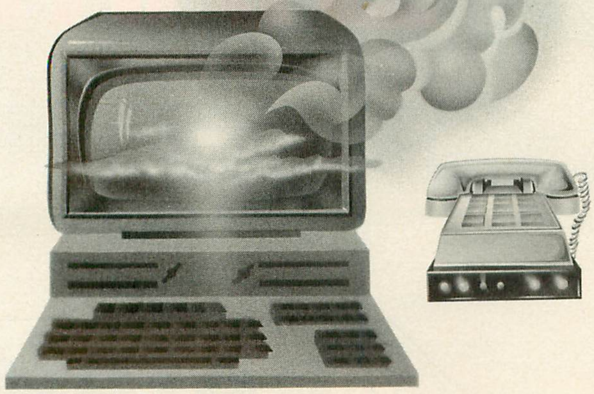
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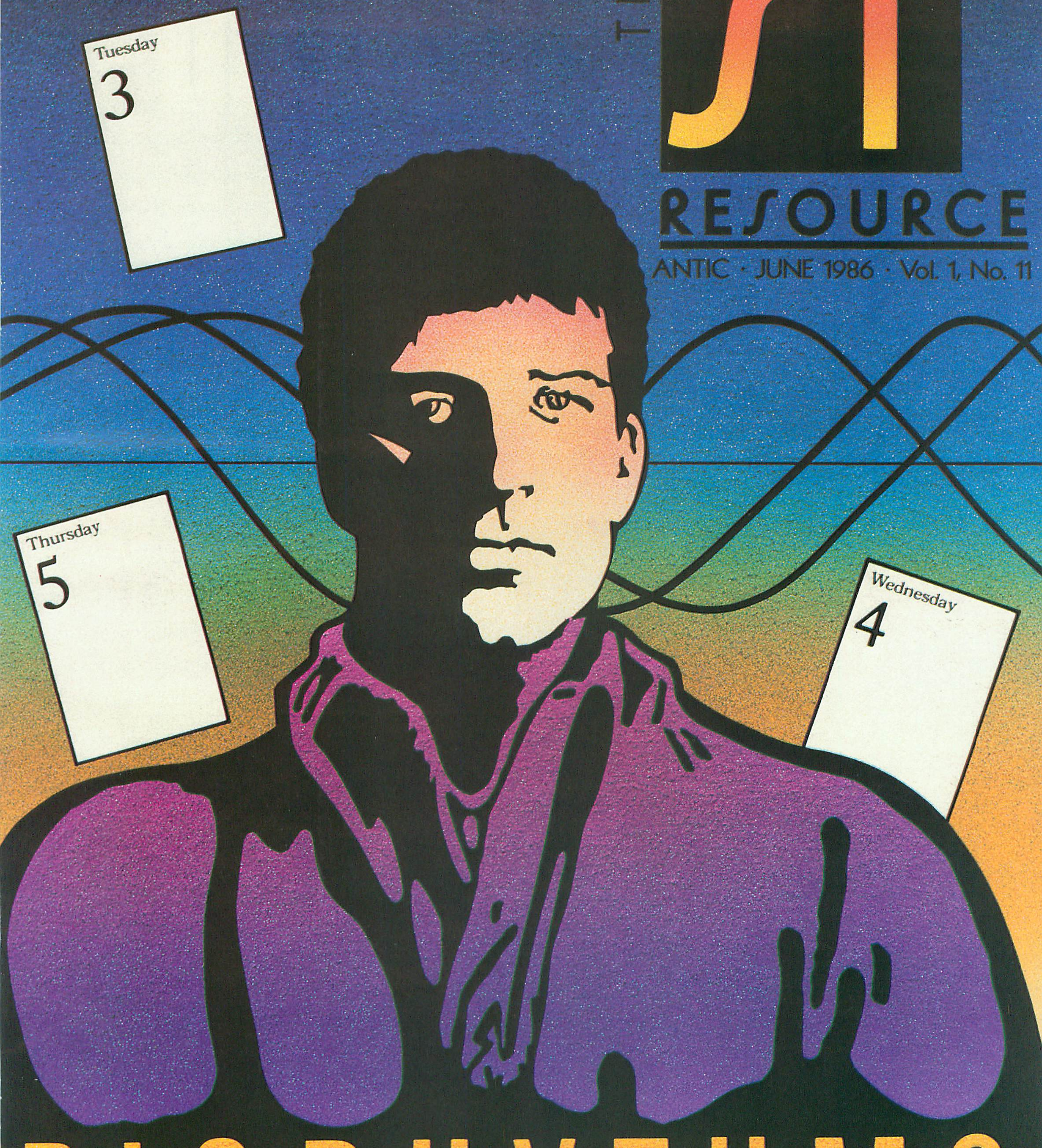
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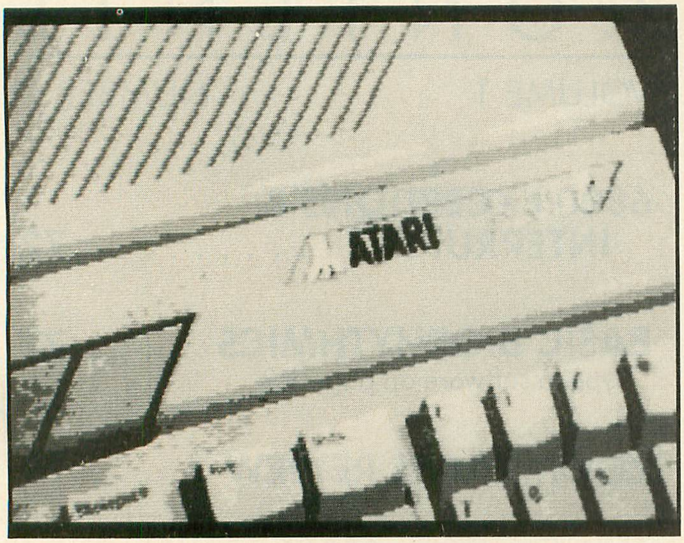
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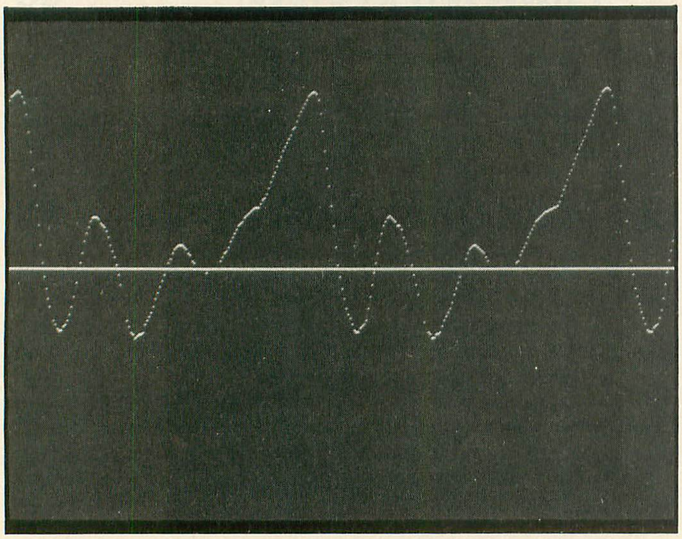
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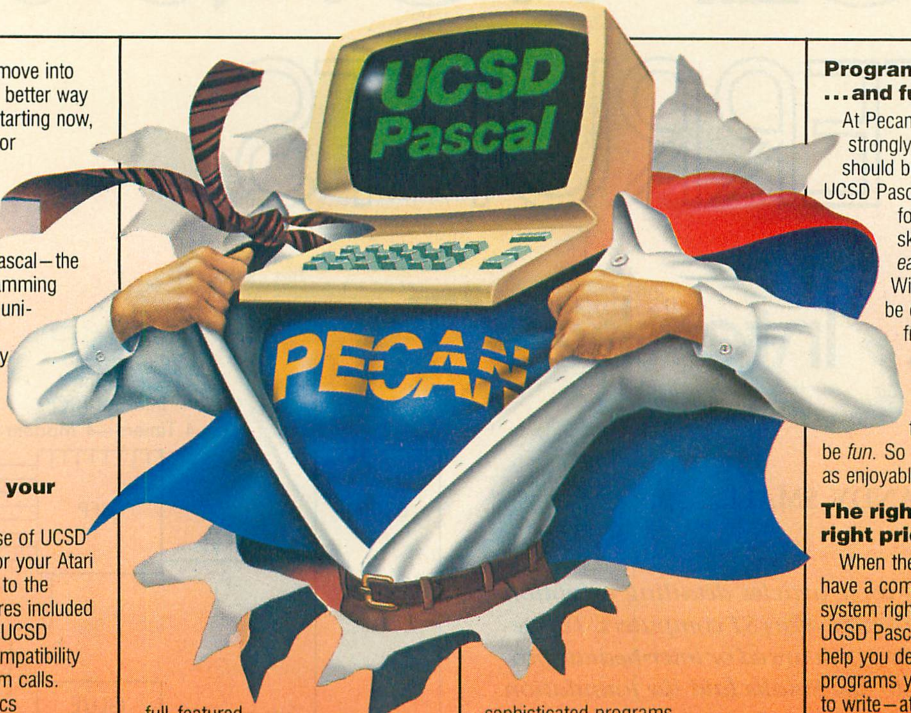
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68000 EXCEPTIONS & INTERRUPTS

Part II: Into the ST

by DAVID and SANDY SMALL

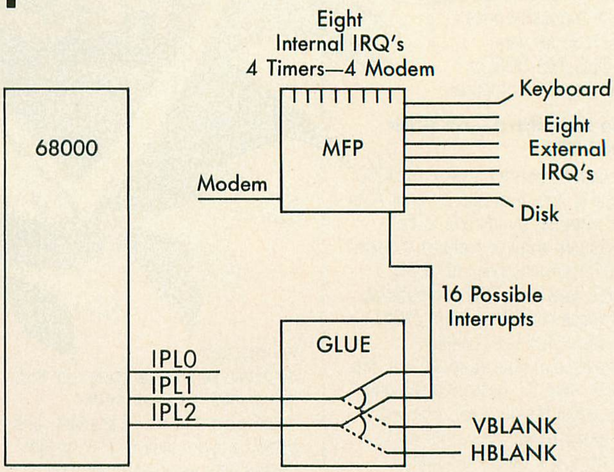
This is the second of three articles detailing exception and interrupt theory for the Atari ST computers. This series is aimed primarily at advanced or intermediate programmers. Last month, the Smalls laid the foundation by discussing interrupts on the 6502 microprocessor. In this issue, they plunge ahead with the 68000.

Before beginning, however, you should note that part of the discussion deals with interrupts as they are implemented specifically for the ST. This is a superset of the normal 68000 interrupts, helped along by the ST's special chips. Not all aspects of the following material will necessarily work on other 68000 computers such as the Macintosh.—ST RESOURCE

Last month we were continually referring to "interrupts" on the 6502. Well, now we can tell you that the 68000 microprocessor doesn't have interrupts. It has "exceptions". Exceptions, says the Motorola book, are "exceptions to normal processing." Doesn't this sound like an interrupt? Does to me. But there's more to it than just an interrupt.

First, let's discuss "Interrupt Exceptions," one type of exception that is close to the 6502 type of interrupt.

There are three pins that input to the 68000, called **IPL0, IPL1,** and **IPL2**. IPL stands for Interrupt Priority Level. Whenever something (namely, the ST chip called GLUE) trips these pins, an interrupt is generated. But there's a catch—the interrupt may be ignored, depending on the "current processor interrupt priority level" (IPL), a register within the 68000.



MFP vs. Screen Interrupts

Note: Don't confuse the **IPL** *pins*, which I have printed in **bold** type, with the IPL *register*. The IPL register is part of the general Status Register (SR) that tells the 68000 which interrupts to handle, and which to ignore. (So it's the "masking" part of the interrupt system).

INTERRUPT LEVELS

There are 8 levels of interrupts, starting at 0 and ending at 7. They are organized like this: Level 0 interrupts are strictly low priority stuff (like a 6502 IRQ); Level 7 has the interrupts that Really Ought To Be Dealt With Right Now, No Fooling Around (like a 6502 NMI). You place a number from 0 to 7 in the IPL. The 68000 then ignores any interrupts equal to or below your current IPL level.

You find the IPL as the low 3 bits of the high byte of the status register. The status register is 16 bits, and the IPL bits (0-7) are as follows:

xxxx xipl xxxx xxxx

You can move into, AND, OR, XOR, or whatever, to the status register to set the IPL. For instance, to set IPL = 2, you could **move.w #$0200,SR**. There's more to it than that, and we'll get to it in a moment.

<Hacker Note: The "below," two paragraphs above, is "equal to or below", not simply "below". If you are at IPL = 4 and you get a Level 4 interrupt, the 68000 will ignore it. Careful!>

An example? Okay. At the beginning of every horizontal TV line (HBLANK), the 68000 gets a Level 2 interrupt. If we handled each one of these interrupts, a great deal of the 68000's time would be taken up without reason. So we set the IPL to 3, and the 68000 ignores Level 2 interrupts.

<Hacker Note: The interrupt remains "pending." But as long as the IPL stays above or equal to 2, it isn't dealt with. However, if you ever let the IPL slip to below 2, even for one instruction, you're going to be interrupted. Suppose we were masking a 5 into the IPL by getting rid of the old bits with an ANDI and then adding the new bits with an ORI:

```
ANDI.W   #$F0FF,SR   Mask off old IPL bits
ORI.W    #$0500,SR   Put in new IPL bits
```

You'll be at IPL 0 for a moment after the AND, and all sorts of unpleasant things may happen. Careful! A better idea is to copy the SR into a temporary data register, modify the IPL there, then copy it back in one instruction.>

Now, let's say an applications program sets the IPL down to 0. (It shouldn't, but many 68000 programs do.) An HBLANK interrupt occurs. You know what the Atari engineers do? They handle this by setting the IPL back up to 3, and returning—nothing else—thus disabling the HBLANKs again. Of course, if you need HBLANKS, primarily for fancy graphics, you can use the HBLANK vector.

What interrupts are hooked up this way? There are:

HBLANK—Level 2. This tries to happen every time we start a new scan line—very often. It is usually not allowed to happen.

VBLANK—Level 4. This tries to happen every 1/70th of a second in monochrome. It is usually allowed to happen. (PAL color runs on the ST at 50 refreshes per second, NTSC color runs at 60.) If you are a 6502 programmer used to a standard 1/60th of a second vertical blank rate, you will need to readjust your thinking.

MFP—Level 6. These are a whole new breed, which we will talk about shortly. Generally, they are always allowed to happen.

If you're a hardware type, you'll see that there are no odd numbered interrupts. The lowest interrupt request line, **IPL0**, is tied off to nothing. The three **IPL** pins are a binary code for the interrupt request priority level. This means: No odd numbered interrupt requests exist on the ST. **IPL1** hooks to HBLANK, **IPL2** hooks to VBLANK, through the GLUE chip. Ordinarily, **IPL1** (Level 2 interrupt) gets triggered each HBLANK, and **IPL2** (Level 4 interrupt) gets triggered each VBLANK. As I said before, the 68000 generally lives at IPL 3, so it ignores Level 2, but responds to Level 4 and above.

MFP (Multifunction Peripheral Controller) interrupts, which we'll get to in a moment, are Level 6 (both **IPL1** and **IPL2** triggered). The GLUE chip temporarily unhooks the **IPL** lines from HBLANK and VBLANK, and trips them together to get a Level 6 interrupt request when the MFP chip asks.

The IPL 2 and IPL 4 interrupts are known as "auto-vector interrupts". This is a flavor of interrupt for the 68000. There are two flavors of interrupts: auto-vector and user-vector. In the auto-vector mode, the 68000 is told to interrupt, and given a priority level. It figures out the "auto vector address" all by itself. This address contains the address of the interrupt handler. In other words, the 68000 looks up the address to jump to, for handling the interrupt.

The table is located in low memory, and looks like this:

AUTO-VECTOR INTERRUPT EXCEPTION TABLE

$64—Level 1 interrupt handler address (bomb)

$68—Level 2 interrupt handler address—HBLANK HANDLER

$6C—Level 3 interrupt handler address (bomb)

$70—Level 4 interrupt handler address—VBLANK HANDLER

$74—Level 5 interrupt handler address (bomb)

$78—Level 6 interrupt handler address (bomb)

$7C—Level 7 interrupt handler address (bomb)

If you look at location $68, you will see a 4-byte address. At that 4-byte address is the HBLANK handler we talked about a moment ago. Remember, this is a table of addresses . . . pointers, if you will.

When the 68000 gets a Level 2 interrupt, it looks up the address that's been placed in $68, and starts executing at whatever address it found there. If $68 contains $FC001234, the 68000 will jump to $FC001234.

BOMBS

Note the addresses that are marked (bomb). Since we're not supposed to get interrupts like these, they go to a special diagnostic to let you know that something is terribly wrong. (In this case, you may have a hardware problem. Perhaps the GLUE chip is not socketed properly). The error handler generates a row of bombs onscreen. (In the older disk TOS, the error symbols were mushroom clouds.) Then it tries to restart GEM.

<Hacker Note: GEM is restarted by using the Terminate Process call. It works *if* things aren't too badly fouled up (such as RAM data structures). However, be forewarned. Terminate Process can seem to work—yet things in memory are still left damaged.

Even RESET does not necessarily cure a memory table

continued on next page

damage problem. You may have to power off, then on to cure some problems. The RESET routine looks at two memory locations to see if memory was ever initialized. If it has been initialized, various tables of memory are not re-initialized by RESET. So if you press RESET and tables in "already initialized" memory are damaged, they won't get fixed.

MFP INTERRUPTS

Now things get a bit trickier. Let's talk about the other style of interrupts, which are MFP interrupts.

As far as I have been able to determine, MFP interrupts are Level 6 interrupts. They quit happening if your IPL is 6 or above.

When the 68000 is told to interrupt, a complex set of events takes place on the system bus. It boils down to this: The 68000 can either be told where to go, or figure this out for itself. The GLUE chip determines this. When we get an HBLANK or VBLANK interrupt, the 68000 figures this out by itself, using the above auto-vector table. (Hence the auto-vector term—it's automatic.)

However, the MFP is a whole different breed. When the MFP asks for an interrupt, it tells the 68000 exactly where to go. The 68000 does not use the "auto-vector 6" for the MFP's Level 6 interrupt as you would expect.

The MFP is many things rolled into one chip. The intent of the MFP is to reduce chip count in a system by combining a bunch of needed functions all in one chip. There's a serial port for your modem, timers and—important to us here—an interrupt controller.

The MFP can generate 16 different interrupts. Furthermore, it will supply the 68000 with an address for those interrupts, skipping the whole auto-vector table above (even though it is a Level 6 interrupt). This is important because the 68000 doesn't have to spend time hunting around trying to find who interrupted it (polling). The MFP jumps the 68000 straight to the interrupt service routine.

Just where the 68000 is sent is determined by what MFP interrupt happened. There's a table, starting at $100, that covers all 16 MFP interrupts. It tells the 68000 where to go to handle that particular interrupt.

As you will see, most of the MFP interrupts start life unused. They are disabled, exactly as we turned off the 6502's interrupts with IRQEN. (In fact, there are 16 bits in the interrupt mask registers of the 68901 IMRA and IMRB registers that are the mask bits.) However, they are there if you wish to use them:

MFP INTERRUPT VECTOR TABLE

$100 (initially disabled)—Parallel port interrupt handler

$104 (initially disabled)—RS-232 carrier detect pin handler

$108 (initially disabled)—RS-232 clear to send pin handler

$10C (initially disabled)—Graphics blitter chip done interrupt handler (see below!)

$110 (initially disabled)—MFP Timer D done handler

$114—200Hz System Clock (MFP Timer C) Handler

$118—Keyboard or MIDI interrupt handler

$11C (initially disabled)—Floppy/hard disk data request handler

$120 (initially disabled)—Horizontal blank counter: MFP Timer B

$124—RS-232 transmit error handler

$128—RS-232 transmit buffer empty handler

$12C—RS-232 receive error handler

$130—RS-232 receive buffer full handler

$134 (initially disabled)—MFP timer A

$138 (initially disabled)—RS-232 ring detect pin

$13C (initially disabled)—Monochrome/color monitor change detecter

<Hacker Note: The 68901 itself is told the base of the interrupt table in the VR register. You can change this if you wish. You need a copy of the 68901 documentation.

PHANTOM BLITTER

Interrupt Vector $10C is used by the Atari graphics "blitter" chip, which is to be a high-speed memory move chip very similar to what the Amiga uses. While not officially announced at this writing, Atari internal sources say the blitter chip is on the way, and Atari officials speak of it openly. It's clear from the documentation (BIOS) that support for the chip is already built in. My guess is we'll see it on the extended ST due out eventually.

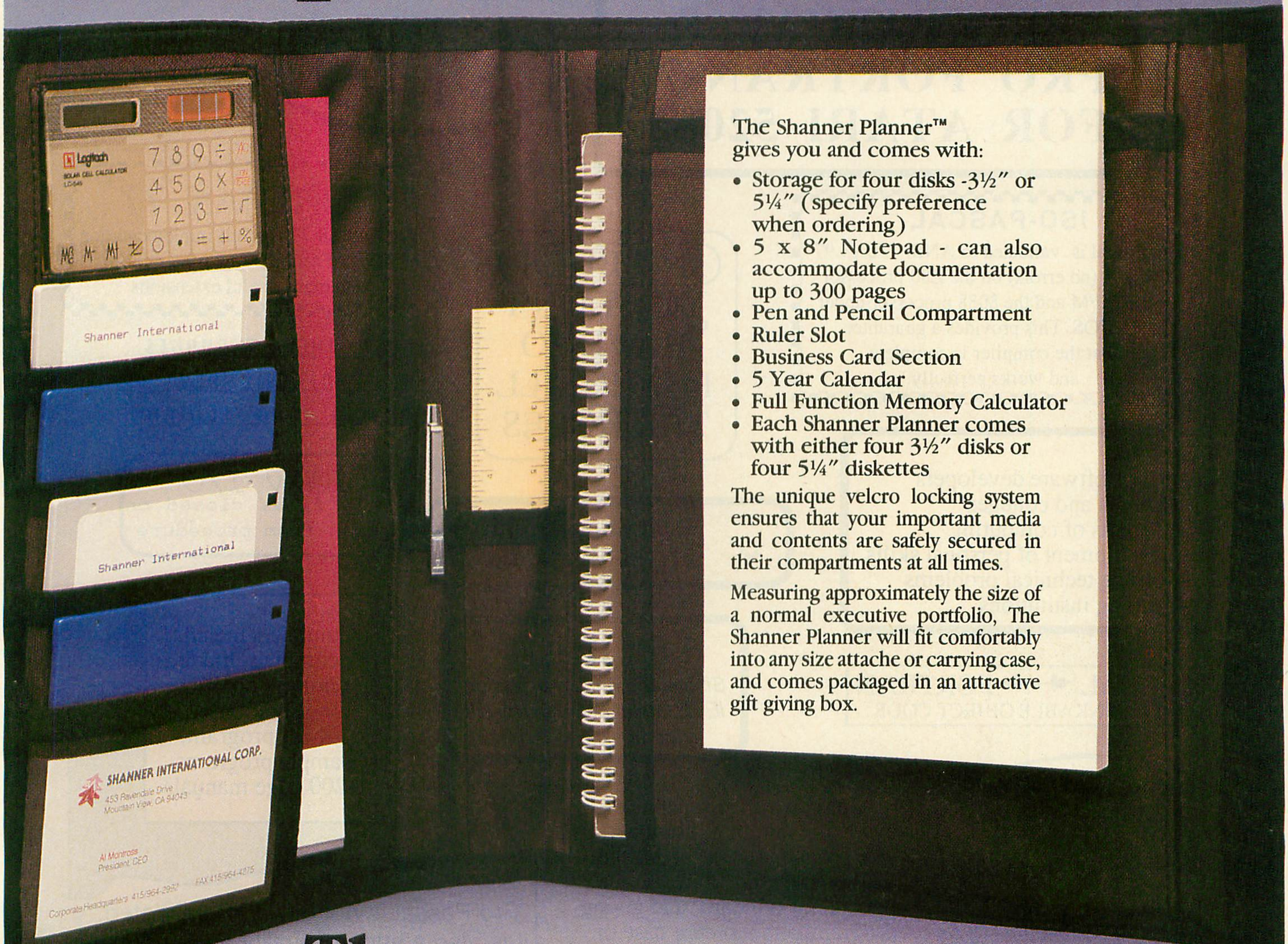
Eight of the 16 MFP interrupts are from external sources, things like RS-232 connection pins. The other eight are generated internally, either timers which have counted down and need to be attended to, or the RS-232 port internal to the MFP.

The initially disabled vectors can be used for various things. For instance, if your modem generates a "ring detect" signal, you could hook this to the Atari ST, and have an interrupt occur whenever your phone rings. This could be a very good thing for a bulletin board system.

If you look at these vectors with your debugger, you'll see that once again, most are pointed at the system bomb handler (the unused ones) and some are pointed at real handlers. Remember, what you see is the address of the handler routine, not executable instructions.

Though all 68000 interrupts are classified as exceptions, not all exceptions are interrupts. Next month, we'll expand our examination of 68000 exceptions and the exception handlers.

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BASIC BIORHYTHMICS

First ST BASIC application

by STEVE WHITNEY

When ST BASIC finally became available, I was determined to write a program that would demonstrate its real power. Several "biorhythm" programs had been floating around the public domain. "Why not?" I thought.

BIO BACKGROUND

So, what are biorhythms? Good question. Biorhythms chart certain *alleged* biological rhythms (hence the name) which begin at birth and continue through life. There are Physical, Intellectual and Emotional rhythms.

These rhythms are simply, in essence, plotted sine waves (see *Artistic Mathematics* in this issue). When one of your biorhythms is at its highest point on the curve, your ability to deal with that area of your life is likely to be high. When a biorhythm is low, your ability may be dulled. But on days when a particular biorhythm is crossing the center axis (horizontal midline), it may be considered a *critical* time in your biorhythm. When more than one of the biorhythms cross that horizontal center line at the same time, it is considered to be a double or triple critical day. (Stay in bed!)

You might try keeping a record of how you feel on certain days and then, later, compare your observations with the biorhythm and determine their validity. I have tried this and found it to be quite accurate sometimes—but quite far off on other occasions. (*We would like to add that many consider biorhythm analysis to fall into the same category as astrology.*—ST RESOURCE)

BIO TYPE-IN

ST Biorhythms will run on any Atari ST regardless of resolution. Boot your ST and activate ST BASIC. If you have a lot of desk accessories or a large background program in memory, ST Biorhythms may not load. To overcome this, use your mouse to *de-select* Buffer Graphics from the Run Menu of ST BASIC. This will give you an additional 32K of memory. Type in Listing 1, BIORTHM.BAS, and SAVE a copy to your disk before you RUN it.

The program will **full** and clear the output window, then ask for your birthdate, name, and the month for which you wish the biorhythms plotted. When these are answered, the program will ask if you want the chart sent to the [P]rinter or the [S]creen. Choose [P] or [S] and the biorhythm begins printing out. When the chart is finished, press [Help] or [Esc] to end the program.

BIO LOGICAL

Let's examine Listing 1. You might have already noticed there are no **gotos** in this program. ST BASIC has features that make writing a **goto**-less program easy. Starting from the top, line numbers 1000-1050 are the program title. Lines 1070 to 1130 comprise the entire work loop in this program. And this loop does exactly what it says: **while not finished, gosub BIORHYTHM**. Eventually the program will be **finished**, and the program will end.

COUNTDAYS will count the number of days between **birthtime** and **printtime**. At one time or another it will call one of the four self-explanatory subroutines located below it, between lines 1270 and 1520.

Next, the main routine **BIORHYTHM** starts at line 1540. This routine will clear and **full** the output window, place the title along the top and gather in the desired birthdate,

name, and month of printout. Limited range-checking is done on the information typed in, and the program proceeds to **COUNTDAYS** (line 1930), which counts the number of days between the birth date and the start of the displayable month.

Next, the program stops and asks for the desired output device. Select either [S]creen or [P]rinter (upper or lower case are both okay) and continue. Between lines 2060 and 2070, control is diverted to whichever output routine you choose.

Line 2110 is where the screen output subroutine **ONSCREEN** is located. It first clears the output window, then the subroutine **FANCY** will draw the displayed box and fill the background with a pattern. **LABEL** will print the labeling on the graph. Next, print the title along the top of the screen. Next, we have a nested **for. . .next** loop that will plot each of the cycles onscreen. Below that, perform a **vdisys()** call to set the linewidth to 1 pixel wide, then stop in a loop—**GETKEY**—waiting for a keystroke.

The subroutine **HELP** prints a keystroke reminder onscreen. **ONPRINTER** is the routine that prints out the biorhythm chart onto paper. This routine as written will work on any Epson, Star Micronics, or Epson compatible printer, (such as an ADS-2000). It performs an ASCII dump, and as such does *not* require your printer to handle graphics.

CALC and **FINDR** are small *number-crunching* subroutines that are called from above in the output routines. **LABEL** and **FANCY** are described above, where they are called from.

INITIALIZE performs the initialization needed to run in any resolution. It determines the current resolution, initializes constants, and fills arrays with needed start-up information. Finally, **INITLOREZ**, **INITMEDREZ**, and **INITHIREZ** contain resolution-specific information.

BIO WRAP-UP

Can you see the power of Atari ST BASIC? C'mon, all you ST BASIC Programmers out there! Let's show the world what the ST can do. . . BASICally.

Steve Whitney is a freshman at Stanford University, trying to decide whether to major in electrical engineering or computer science. His parents bought him an Atari 800 in 1982 and it all went from there.

ZOOMRACKS

Database with "time-card" metaphor

by JOHN KOSIOREK

Zoomracks is an untraditional, text-oriented database. The name is derived from the information format that simulates cards stored in racks. The user can "zoom" in and out of details contained on the cards.

The rack emulation provides a visual approach to data manipulation that helps in learning to use the database. The documentation says the metaphor for this product is similar to a rack of employee time-cards. You take a card out of the rack (zoom in) to examine or change its details. Then you can put it back in the rack (zoom out) or copy it to another rack.

If you have an application that requires storing information on various-sized cards, Zoomracks can provide a method to control and organize it. Since Zoomracks has no numerical functions, it follows that there are no mathematical capabilities available for report processing. Instead, Zoomracks emphasizes flexible data manipulation and control.

The various elements of Zoomracks are not exactly the same as those in more traditional databases, so the names are somewhat different. Fields, the smallest blocks of defined data, are called "fieldscrolls". The reason for the different name is that fieldscrolls do not have a defined length. Any field may be up to 80 columns wide and up to 250 lines long.

There can be 27 fieldscrolls to a "quickcard," which is analogous to a record. Quickcards are grouped into "zoomracks" which are similar to files. Nine zoomracks may be in memory simultaneously, and up to nine files may be displayed on the screen. By allowing records on the screen from various files, merging and comparing data between zoomracks can be easily accomplished.

Another way to look at this system design approach is to consider the file directory as a rack of Zoomracks files. A Zoomracks file is a rack of quickcards. A quickcard is a rack of fieldscrolls and a fieldscroll is a rack of text. This is how Zoomracks achieves much of it flexibility.

TYPCIAL SEQUENCE

A typical sequence for viewing specific data might start by finding the file in the directory rack, then loading the file into another rack. This is followed by finding the record or quickcard in the file and displaying that card on the screen. This will show the first line of all the fieldscrolls for the quickcard. And each fieldscroll viewed can be expanded to a maximum of 250 lines.

Zoomracks also features user-definable 2-key macros for performing repetitive tasks or for entering repetitive data strings. The database is RAM-based so the total number of records or files accessible at any time by the system is dictated by the amount of available RAM. When Zoomracks is loaded into a 520ST with TOS in RAM and no desk accessories, there are 56,000 bytes for data files. A "gas gauge" at the bottom of the screen graphically shows RAM usage. Menu options are always present on the screen.

The documentation consists of a 128-page instruction manual, with a table of contents but no index. It takes a step-by-step approach to presenting the features of this software and is designed for both the ST and IBM versions of Zoomracks. The main difference between the ST and IBM versions appears to be in the keyboard and in the Atari's use of the mouse device—though no GEM graphics are utilized here.

An online tutorial and a few demos are provided, along with sample data files. There is also an online Help function that provides additional information about your current system location. The demos are interesting and provide a view of many of the system's features, but they cannot be implemented in your own files without first reading and understanding the instruction manual.

The tutorial is informative and gives a feeling of the flavor of the program, but learning by doing seems to be the best approach with this package. An undo command is present for most features—although the Atari's handy [UNDO] key is used only during text editing.

Other keyboard choices act as toggle switches where the same key again reverses the previous action. Moving through the racks, cards and fields can be accomplished by several methods—keystrokes, function keys, macros, or the mouse. Fieldscrolls can be added, modified, moved, or deleted. This allows for reformatting an entire file quickly and easily. As a matter of fact, fieldscrolls and quickcards can be moved between zoomracks just as easily.

MANY CHOICES

In a typical Zoomrack session, once the directory rack is loaded, the program searches for a rack called MACAUTO and, if found, it is loaded. The menu choices appear at the bottom of the screen just above the memory gas gauge. But they are only there as a visual reminder of specific modes of operation that can be chosen. You are not limited to them. Processing choices can be made by using the appropriate key, macro, function key, mouse or by pressing the [RETURN] key to select the menu choice currently displayed in inverse text.

Compared to other databases, it is easy to reformat a quickcard and add or delete fields. Files may be sorted or searched on any field. A major limitation is that only one sort field or search string at a time is allowed. There is a cut-and-paste feature that allows quickcards, fieldscrolls, or partial fieldscrolls to be cut into a buffer and pasted into another location. Text within a fieldscroll may be formatted by use of the field editing features—a small text processor that can handle about three pages of correspondence per fieldscroll.

Printing controls provide for one or all quickcards to be printed. Ranges can be printed by moving the desired range of records to a temporary rack. While this may seem like a tedious task it is actually not difficult to do. Labels may be printed in the same manner by resetting the height and width of the display screen, which changes the height and width of the area to be printed. In keeping with the visual interface, this method allows the user to see what will print ahead of time. Files may be loaded or saved in Zoomracks format, or in ASCII format for sharing data with other programs. Further processing of the ASCII files will probably be required to get the data in a format another program could use.

Zoomracks could be used for any list application that does not require the math abilities of other databases. All fields are considered to contain text data. Mailing lists, appointments, any type of notes, or a client list are applications that instantly come to mind. A field can be three pages long, and racks can be merged and printed. Therefore, form letters in one rack can be individualized with the names and addresses from another rack and then printed.

EASY INTERFACE

The Zoomracks user interface is well thought-out, providing visual clues for most of the processing options. But, as in any system where complex actions are possible, learning the many uses of Zoomracks is a time-consuming process. My only problem occurred when writing to a full disk during the rewrite. No message appeared on the screen, but records were lost and the last record written to disk was incomplete. The file could be loaded, but trying to process the last record crashed the system. By using the quickcard copy feature and the macros, I saved valid records to another file.

The most confusing part of learning and using this system is that there are often several ways to make the same processing choice. The user is faced with choosing between using keystrokes, or a function key, or a macro, or pressing [RETURN] to process the current menu option—*or* pointing and clicking with the mouse. While this provides a high degree of flexibility to the experienced user, it makes learning the system more difficult.

When files are loaded to a rack, the files already in memory may be moved to another rack. This means you'll have to search through several racks to find a file. A helpful function here would be a directory of files in memory along with the directory of files available on disk. The program could be made much stronger by the addition of mathematical and numerical functions along with the reporting methods that numerical fields require.

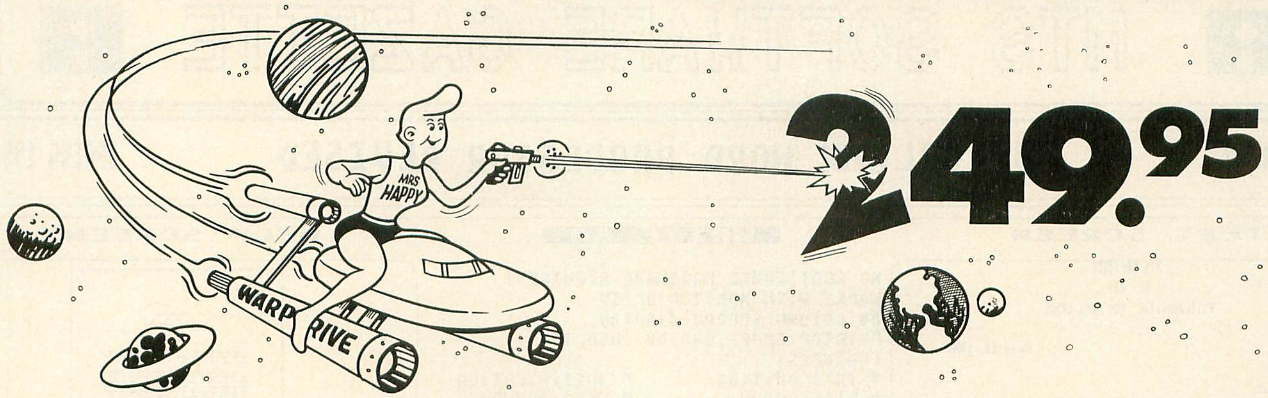
The 520ST has a friendly [HELP] key and Zoomracks provides online help screens specific to the current processing function, but the [F4] key is used to toggle the help function on and off. I assume this is for the sake of compatibility between the ST and the IBM keyboard which lacks a [HELP] key.

Zoomracks is not copy-protected. Quickview Systems say they plan to constantly improve and upgrade this product and they welcome user input. Also, Quickview plans to provide upgrades at a nominal charge to current users.

If your applications require mathematical capabilities, you will not find a use for this database program. But if manipulating and organizing text can solve your problem—and you are interested in a new visual perspective on database processing—Zoomracks could be just what you are looking for.

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MTS SOFTWARE GAZETTE

Vol.1 No.2 — **80 COLUMN WORD PROCESSOR REVISED** — SPRING 1986

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Box 623
Williamsville, New York 14221

March 19, 1986

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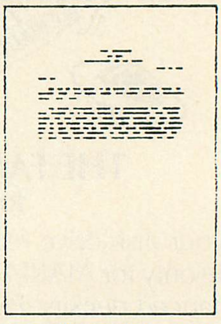
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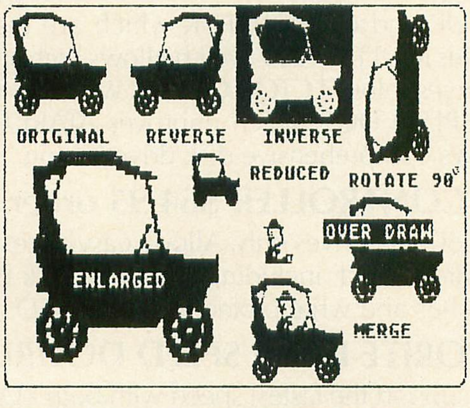
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ATARI'S FIRST-RATE "FREEWARE"

by CHRISTOPHER CHABRIS

1st Word

ST users starved for applications software that's designed to use the friendly visual interface of the GEM desktop glimpsed a light at the end of the tunnel last December. With its own GEMwrite package not yet ready for release, Atari Corp. began including **1st-Word** with each complete 520ST system sold. 1st-Word, by British software developer GST Holdings Ltd., is a capable word processor with basic editing, formatting, and printing factilities that should satisfy most ST users. And it's Free. At this writing, Atari planned to continue packing 1st-Word with every 520ST.

A GEM application's visual appearance is essential to its convenient and productive use. 1st-Word performs admirably in this category. Its drop-down menus are well thought-out, its windows are well designed and placed, and it works flawlessly with the standard desk accessories. After double-clicking on its icon to run 1st-Word from the desktop, you are presented with the menu bar, a strip of function key icons, a font table, and the standard GEM Item Selector dialog box. Select a file to edit and a window zooms open to display its contents.

1st-Word is a What-You-See-Is-What-You-Get word processor. Each document window displays your text centered, justified, boldfaced, italicized, underlined—you get the idea. Although top and bottom margins and headers and footers are not displayed, print preview screens and test printouts are virtually unnecessary. Unfortunately, underlining gets wiped out when you start typing on the next line, and superscripts and subscripts appear as normal characters.

To speed the editing process, 1st-Word does not reformat and restyle your text as you type. Instead, after modifying a paragraph, you must choose a menu command to force a new display showing your changes. I was annoyed by this at first, but quickly got used to it. The time saved really does make up for a temporary visual mess.You may have up to four document windows open at once, and you can switch back and forth between them by clicking the mouse anywhere on the next document you want to use. Windows implement all the customary GEM operations, including moving, sizing, zooming, horizontal and vertical scrolling, and closing. A ruler line under the title bar displays tab and margin settings. If you change them (with the mouse) the new settings apply to text typed after the changes. Previously entered text remains the same.

CUT, PASTE, SEARCH

1st-Word maintains a single cut-and-paste buffer so that text can easily be transferred between documents. Simply select the text you wish to cut (or make a copy of) by either surrounding it with a rectangle or marking its beginning and end, choose Cut block (or Copy block) from the Block menu, position the cursor wherever you want the text to reappear, and choose "Paste block" from the Block menu. Presto! Additionally, blocks of text can be deleted, moved, written out to disk files, and read directly from disk files into documents (sort of a "Paste file" function).

Search-and-Replace capabilities are standard, allowing forward and backward search and matching of upper and lower case. Strangely, if you keep typing beyond the edge of the dialog box when entering the string to search for, the line cursor moves off into the text but the characters you type don't

continued on next page

appear on the screen. If this is intentional, I'm glad the program doesn't crash. There must be a better way to handle this.1st-Word also has several unusual editing features. Word wrap can be turned on and off. Four separate "marks" can be set anywhere in the text so that the cursor can move there via a single menu selection. Using the GEM Item Selector, you can delete files from your disks without returning to the desktop.

ASCII EDITOR

The program can also be made to function as an editor for simple ASCII text files, with no style or format information saved to disk. This mode would be useful for telecommunications buffs who compose messages for uploading and must have plain text output. Programmers will find this mode excellent for writing source code.

The current page number is displayed in the left window margin. Each function key (F1-F10) can be activated by clicking on its icon in a strip that appears at the bottom of the screen. It is possible to enter any printable character in the ST character set by clicking on it in a 16 × 16 table that displays each and every one, including the Fuji symbol and the various GEM icons. Unfortunately, you cannot use the search and replace function on words created with special characters. (Note that these last three visual features only appear in medium and high resolution displays.)

Document formatting is controlled from the Layout dialog box summoned from the File menu. Here you are invited to specify the top and bottom margins, total page length and header/footer text. Although headers and footers can each be only one line long, each can have a left, center and right-justified component plus an embedded page number. Page numbers must appear on every page. Interestingly, verso/recto printing is supported—your pages can be left or right oriented. The user can create conditional and normal page breaks by dragging the mouse in the left window margin.

It is good that all of 1st-Word's formatting features work flawlessly, since there are so few of them. More flexibility is needed because people will find more uses for the program than reports and business letters. I would consider double-spacing, multi-line header and footer text, date and time insertion, and perhaps even footnoting, essential capabilities in the next release of the software.

New users may not need all this, though, and it seems that 1st-Word was designed with them in mind. A long Help menu offers brief reminders on key topics, as well as an Extra Help option that automatically inserts a dialog box reminder between all menu selections and their execution. I'm not sure that even first-time computer users won't outgrow this within five minutes, but its always there if you feel insecure. It's too bad that neither the [HELP] or [UNDO] keys are used, since both have obvious uses in word processing.

As shipped, 1st-Word includes drivers for Epson dot-matrix and Qume Sprint daisywheel printers, as well as a generic ASCII-only driver that ignores all special character styles. Near letter-quality print mode is supported for printers that have it. A special program is used to install the driver of your choice so that 1st-Word will use it when you select the Print command. (For some reason, documents can only be printed after all windows are closed.) Drivers for several other printers have been posted to SIG * Atari on CompuServe, so check there before writing your own.

The documentation for 1st-Word is stored on the program disk. A short note provided clear instructions so that beginners would have no problem printing out a copy. Future versions may include a typeset manual—but this costs money. Printed out, the manual is 42 pages long with no index. It is concise, consistently organized, and very well written for both beginners and experienced users. A tutorial text file is also included on the disk.

ROBUST ENTRY

I have very few criticisms of 1st-Word. Like all other ST word processors I have seen, it does not offer Macintosh-style multiple type fonts. It also has idiosyncracies and minor bugs. But as an entry-level GEM word processor it is much more than I expected when I got it. Its best feature is an outstanding robustness—it has yet to crash and dump me into a desktop full of bombs. I only wish 1st-Word had been available last summer!

1ST-WORD
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000

DB Master One

The long-awaited ST version of Stoneware's **DB Master One**, a popular database manager for the Apple II and Macintosh, finally arrived in December. I assumed that since Atari was giving it away with each complete 520ST system purchased before Christmas, it couldn't be worth selling. I was wrong. DB Master One is an excellent GEM-based program that should be able to handle most users' file-management needs.

The DB Master One package includes a disk containing the two programs MAKEONE and USEONE, a 43-page indexed manual and a product registration reply card addressed to Stoneware. Apparently, Atari is handling the distribution and marketing of DB Master One while Stoneware develops and supports it. Indeed, shortly after registering the program, I received from Stoneware an "order form" for technical support. For $25, users can purchase 30 minutes of telephone consultation. This is a policy that I strongly oppose. Why should users of a low-end productivity package have to pay extra for the support they deserve and receive free of

charge from companies like Optimized Systems Software?

(*We asked Stoneware about this. They told us that customer support has become the single most expensive area of software marketing. In order to keep the cost of a product like DB Master One down, they believed they had to establish a support service charge. Stoneware also felt most users would have little need for customer support on DB Master One. But if they had tacked the customer support charge onto the product's price tag, people who didn't need the support would be paying for those who did.*—ST RESOURCE)

DB Master One is extremely intuitive. This is primarily an entry-level database, but a very flexible one. Even new users should be able to start using this program productively right away. Making extensive use of the GEM user interface and help menus, DB Master One is easy to use in itself. But the concise, well-written, and helpfully illustrated user's manual is always there if you run into trouble. It includes complete descriptions of each drop-down menu and dialog box used by the programs. An unusual but welcome feature is "Understanding File Management," an introductory chapter for new users.

TWO MODULES

Several features are common to both modules of DB Master One. All desk accessories are available from within the programs, many menu selections have keyboard equivalents, and help requests at the bottom of each menu call up dialog boxes that explain the commands.

To create a new file, run the MAKEONE program, which presents an empty window where you can place fields and labels. Simply click the mouse where you want a field to begin and drag to where you want it to end. Each field is a rectangle that you fill with information. A field can be either label-only (a title, for example), data-only, or most commonly, labelled data. As you play around with a field's shape, its size in characters is displayed in a corner. Various colors and styles can be combined to create more pleasing visual effects.

If you have already designed a form and created a file with it, you can use MAKEONE to edit the design by adding, removing, re-sizing, and rearranging the fields. When you are done, simply click on SAVE to record the changes.

You will run MAKEONE relatively rarely compared to USEONE, which performs all the file management functions aside from creating and modifying forms. You can add, delete and edit records easily by just clicking on the desired fields and typing in some text. In USEONE you can also find and examine selected records, sort files and print reports.

To get a better idea of just how easy it is to use DB Master One, let's walk through a sample session. Suppose we want to create a simple mailing list.

SAMPLE SESSION

First, as advised by the manual, we'll think out our planned database and record a few notes on paper before even turning on the computer. I found it just as easy to do this within the program since DB Master One makes it so simple to play with form layouts. It's easy to place name, street address, city and other fields in the desired location on the screen.

But it is even easier to take advantage of the "Splat" menu. This is another unique feature that provides several predesigned field layouts (not complete forms) for common filing applications such as checkbooks and mailing lists. Just click and the proper fields are splattered onto the form all at once. If we want, we can now alter the color, size, and style of labels and fields.

We're done creating the form, so we save it to disk and quit to the desktop. Now we run USEONE and begin entering data.

Each record is filled by typing information into the fields. You can either fill them in order, pressing [RETURN] to move to the next, or randomly by clicking on fields as their contents come to mind. After each form is completed, selecting Add Record from the menu bar, or pressing [Control] [A], adds the information to the file and presents a clean form for the next record. When we've thought of all the people we want to put on our mailing list for now, we can save the file to disk for later use.

Now we could modify the form by using MAKEONE again, or run USEONE to print out address lists, mailing labels, and other reports. DB Master One uses icons to facilitate the creation of up to 10 reports from four basic formats. Reports can also be saved to disk for later use and can be output to either the screen, the printer, or a disk file.

THE SPECS

For experienced database users, the statistics on DB Master One are: maximum file size—320000 characters; maximum number of fields—100 per form; maximum field size—3000 characters; maximum record size—3000 characters. It seems that the entire file is kept in RAM when running USEONE. Consequently, sorting operations are fast. A 1,000-record mailing list sorted on the last-name field can be re-indexed on the ZIP code field in just a few seconds! Sorts and searches operate on as many as three fields.

DB Master One is without a doubt the easiest and most enjoyable file management program I have ever used. The manual cover even calls it the "easy filing system for the Atari ST," implying plans for more powerful versions in the future. (*Stoneware has indeed told us of plans for upgrade modules; some of which may be available by the time you read this.*—ST RESOURCE)

There are a few drawbacks to the program. The manual, while excellent in explaining data management and the operation of the program, contains no technical information. I would have liked to see a description of the program's file formats. The program itself could use customizable printer drivers, capability to work on more than one file at once, and a way to import data stored in other common formats. But DB Master One's RAM-based nature and lack of such tools as a programming language and

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natural-language query system do not hurt the program and its purpose, since they really belong in a higher-end product aimed at more experienced users.

In sum, DB Master One should help Atari sell the ST. Prospective users should not be deterred by Stoneware's support policies, because the program is truly easy to use. DB Master One is a real winner for individuals and businesses that need an easy but powerful file manager.

DB MASTER ONE
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000
$49.95

FILE I/O INTRO

Manipulate any ST disk file

by PATRICK BASS, **Antic** ST Program Editor

Hold an ST disk in one hand and slide the metal shutter open so you can see the disk inside. Look at it very closely. Can you see the tiny letters and numbers stored on the disk? Of course not. But they *are* there, and this month I'm going to show how you too can inspect and change *any* legal file on *any* disk.

There are two different operation sequences we will cover. First we will select, open, and read a file into memory. Then we will modify the file and write it back to the disk. We will do all this within GEM using C.

THE FIRST PART

The GEM environment provides a standard way to examine the disk directory and select a filename through the AES call **fsel_input()**.

Before the call is made, you must prepare string space for a pathname and filename, and prepare a memory location to store a returned "button" value. The *pathname* is a string describing which directory GEM should open. (e.g. "a:*.*"). The *filename* can be as long as eight characters, plus a dot (.), and up to three more characters as an extender. So you will need to save string space for at least 12 characters. (e.g. "filename.ext"). The *button* value should be declared as an **integer**. (Note: all data types in this article—except strings—will be assumed to be **integers**, unless otherwise noted.)

When you call **fsel_input(path, filename, &button);**, the familiar file selector box appears onscreen and GEM takes over control of the computer until you click on either the **OK** or **CANCEL** buttons. The path and filename you passed to **fsel_input()** show up in the "directory" and "selection" lines, respectively. Every time the user changes the path or clicks on a new filename, the path and filename strings are updated.

When the user clicks on one of the exit buttons, **OK** or **CANCEL**, the call is terminated, the selector box vanishes, the number of the button pushed (0 = CANCEL, 1 = OK) gets placed into its previously reserved memory location. The user will find the desired path and filename in their respective strings. At this point we have collected all the information needed to properly open a file.

OPEN, SEZ-A-ME

Actually opening a file is very easy. First, since the routine that opens the disk file will return a unique number that we will use to reference the file with, (the *read_handle*), we need to reserve a place for it. The call to open the file itself takes the form: **read_handle = Fopen(filename, option)**, where *filename* is the filename collected from the **fsel_input()** call, (or a string literal), and *option* can be one of: **0 = read, 1 = write, 2 = read/write**.

When this call is made, the ST will locate and open the file requested in *filename*. If the file can't be found, a negative error number will be returned. However, if the file *is* found the routine will assign and return a unique positive number we need to save in **read_handle**. The file is now open and ready for use.

READ TO ME ONLY

Now, before we can read in bytes from an open file, we need to take care of three other things. First, decide on an amount that is equal to, or greater than the total bytes you need to read in. Here we'll call it **max_len**. This variable *must* be a LONG.

Second, reserve or initialize a **char** array that is at least as long as **max_len**. For our demonstration we'll call this array *file_buffer*.

Third, declare a *long* variable to hold the total number of bytes actually read. We'll call this one *bytes_read*.

Now, to read the file, all the above components come together as: **bytes_read = Fread(read_handle, max_len, file_buffer);**, which will read up to **max_len** bytes into **file_buffer** out of disk file **read_handle** and return the total number of bytes actually read in **bytes_read**.

WRITE ON!

When finished working on the file in RAM, we need to write the file back onto the disk. As with the read routine, we first need to select a filename to write to, using the call **fsel_**

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input( ). If you wish, you may use the same path, filename, and button memory space you set up for reading. When you return from the **fsel_input( )** call, determine what type of file you need to create. The choices are: 0=Read/Write, 1=Read Only, 2=Hidden from directory search, 4=system file, 8=volume label. These *attributes* are described fully in Disk Secrets, ST Resource, February 1986.

The actual call to create a disk file is **Fcreate( )**, and it takes the form: **file_handle=Fcreate(filename, filetype);**, where **filetype** is as described in the previous paragraph, **filename** is selected from within **fsel_input( )**, and **file_handle** is a memory location we will use to store the unique number **Fcreate( )** returns to us. Later, we will use this number to identify the file we write to.

When we've created the file we now need to write our information to it from **file_buffer**. The call to write to a disk file takes the form: **result=Fwrite(file_handle, bytes_to_write, file_buffer);**.

Here **file_buffer** is the array in which we have our information, **bytes_to_write** is a *long* value—repeat, a *LONG* value—that describes how many bytes to write. We recieved **file_handle** from **Fcreate( )**, and **result** is the value **Fwrite( )** returns to us. This will be negative if an error occurred while writing, or it will be a positive number describing the number of bytes actually written to disk.

When finished writing, we need to properly close the file using the call **Fclose(file_handle);**. Again, **file_handle** is the variable returned to us in **Fcreate( )**.

SAMPLE PROGRAM

We've brought all of the above concepts together in this month's ST program. You may use either Developer's *or* MegaMax C to type this program in. No changes are required when using either language. (Sorry, Hippo-C owners, this program won't work for you without major revision.) Type in and save the listing, then compile and link your program together. Antic Disk subscribers can find the source code on the monthly disk as FILEIO.C. See the disk's ST Help File for instructions on transfering ST listings to a 3 1/2 inch disk.

What we're going to do in the program is read a file off the disk, then globally swap one character for another before writing the corrected file back to disk.

Once you've got the program compiled, linked and ready to go, double click and run it. First an identification alert box appears, then the program will present an alert box asking for the character that needs replacing. Click on the "+1" or "+32" buttons to change the ASCII value by whatever amount, then click "select" to go on. Follow the same operations to select the replacement character. And now, here come the file selector boxes. We select the file to be searched, then the file the result will be written to. When finished, the program will present a "thank-you" box and then exit.

PROGRAM TAKE-APART

Examine Listing 1. Again, this program can be written in either Alcyon or MegaMax C. At the top are the opening comments. We also have one **#include** file here, **osbind.h**, which is included with both languages. Below that we have a few **#defines**, to make the source code a bit more readable. Pay close attention to the last one, **DELAY**. I have included it mainly to show that we can **#define** not only single characters, but entire statements. Next come typical **int** declarations, **char** strings, and three **long** definitions (including **max_len** as described above.).

MAIN( )

The **main( )** routine is fairly short this month, and pretty much does what it says: **initialize( )**. It then selects the characters to work on, the files to work on, and performs the work. When **finished** becomes TRUE, we **terminate( )** the application.

PICKY, PICKY...

The first routine here, **pick_character( )**, presents an alert box that describes the current character selected. It will stay in the loop literally **while(button does_not_equal SELECT)**. If the user clicks on either the "+1" or "+32" buttons, the program logic adjusts the character count accordingly and stays in the loop. The next routine, **pick_replacement( )**, operates in exactly the same manner.

Notice the last half of the **while...wend** loop. These three routines first convert the stored value for the current character into a two-digit hexadecimal number, and then check to see if the current character can indeed be placed on the screen. If not then it is replaced with a printable space.

READING PASSES

Next we get to **read_the_file( )**. First we alert the user that we are going to read a file. The **Dgetdrv( )** call returns a number (0, 1, 2...) describing the current drive used—or the last drive accessed. We use this number as an offset to the file path by adding the ASCII value of "A" to it, resulting in "A," "B," "C," etc. The next call, **fsel_input(path, in_filename, &button);** presents our file selector box. The next line down checks to see if the button selected was CANCEL. If it wasn't we use the **Fread( )** call to read in up to **max_len** bytes into our array, **file-buffer**. We then **Fclose( )** the file and leave.

ACTUAL CONVERSION

The next routine, **convert_the_file( )**, scans through the array **file-buffer** looking for the replacable character and replacing it with the desired new character.

...AND HAVING WRIT...

Now we come to **write_the_file( )**, which basically works like **read_the_file( )** above. We select a file from the file selector box, and use the filename gathered there to **Fcreate( )** a file on the disk, which we then write out with the **Fwrite( )** call. Remember to use a LONG value for the number of bytes to write.

...MOVES ON.

Finally, **terminate( )** does just that, by saying goodbye, closing the virtual workstation, and exiting the application.

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ST PRODUCT NEWS

ST reviews

HOLMES & DUCKWORTH FORTH
Mirage Concepts
4055 W. Shaw, #108
Fresno, CA 93711
(209) 227-8369
$49.95

Reviewed by Michael Fleischmann

Holmes & Duckworth, those pseudo-Victorian "micronomists" from Mirage Concepts, have introduced a complete Forth package for only $49.95. Yes, I said complete.

H&D Forth is based on the Forth-83 standards and allows access to all of the ST's memory and GEM commands, as well as supporting the ST graphics, MIDI, and printer commands. For those of you who are forever losing your manuals or writing all over the pages, this documentation comes on disk so you can print it out at your leisure. Wait—there's more. H&D Forth also supports both floating point and integer math, all code is fully relocatable *and* there is a runtime turnkey system for developers at no extra charge.

If you are unfamiliar with Forth, it is a language that has the high-level convenience of BASIC but runs at assembly speeds. In Forth you define words to have specific meanings. Once these words are defined they become part of the language and are useable from that point on. In a very short time you can have a language customized to your own personal preferences.

One drawback to Forth is that it is an RPN or "postfix" language, which means the values occur first and the operators follow. For example (1+3)*4 in BASIC looks like 1 3 + 4 * in Forth—which does take some getting use to. The authors of H&D Forth, however, do give several excellent suggestions for what Forth books to get to learn the language.

Holmes & Duckworth originally used this Forth for their own software development. In fact, their new H&D Base is written with it. This new package is quite programmer oriented. The screen editor is easy to use—though somewhat crude. The source code for the Forth is on the disk and a simple kernel is provided for those of you wanting to do applications software.

H&D Forth deviates from the Forth-83 standard in a few ways: The first is that H&D Forth's stack is 32 bits wide, so there are no double words (32 bits) because they are that way by default. However, this is a valid consideration since it gives the programmer access to all of the ST's memory. Another deviation is that multiple dictionaries are not allowed. This decision stems from the fact that Holmes & Duckworth have used Forth for several years and never had need of them. Other than these two deviations, this Forth is a complete standard with enhancements to take care of unique ST items.

H&D Forth supports all the standard file commands (open, close, seek, read, and write) and includes simple mouse and graphics drivers. The most impressive aspect of this Forth is the "turnkey" system. This means after you are confident you are ready to release your software to the

public, you run a little program which turns your code and the supporting code into a hidden format that cannot be read as source. The memory image is then saved to disk.

The concise H&D Forth on-disk manual is intended to instruct you how to use this version of Forth, not to teach you the language from scratch. I was quite impressed with its straightforwardness. It gave me the information I needed to know without wasting my time trying to tell me how to turn my computer on.

The three most important things you need to know are on the first two pages: 1. Back up the disk and run on a copy. 2. Where to go for technical help. 3. There are no royalties to be paid if you use this Forth. The manual then tells you how to boot the Forth and how to get the Forth source listings, ending with the dictionary of the Forth language. Although brief, the manual is thorough, and with the source listings it makes an informative package.

In summary, I give this implementation of Forth quite high ratings. It does everything a Forth processor is supposed to do, it is affordable, it is well supported, and it is easy to use. If you are considering Forth for the ST this is your best. It's one of the best buys that I have seen.

BRATACCAS
Psygnosis Limited
US Distributor: Mindscape, Inc.
3444 Dundee Road
Northbrook, IL 60062
(312) 480-7667
$49.95

Reviewed by Michael Fleischmann

Brataccas by England's Psygnosis Limited is an animated adventure game with ambitious graphics. Your character is Kyne, a hero with a price on his head. You move through many rooms, gather proof of a government plot and try to stay alive. Meanwhile, the 60-odd inhabitants of this world are moving as well—and time rolls on.

Kyne is a genetic engineer who developed a way to make a super-being in the hopes of improving the quality of life for his fellow man. But the government has decided that a race of super killing machines is a better use for Kyne's discoveries. Kyne, on learning this, refuses to continue his work or reveal what he had already learned. Thus, he must go into hiding.

The government issues a warrant for Kyne's arrest, frames him for a crime he did not commit, and puts out a contract for him with the underworld. A bit of overkill here. Everyone is out to get this guy.

While fleeing, Kyne discovers that Brataccas—a small mining asteroid—might hold the answers he needs, so he ends up there. As Kyne, you must find this proof and get it to the proper authorities.

Brataccas, the first colonized asteroid, has become a favorite haunt for miners. With miners comes money and with money comes corruption. The main things the residents of Brataccas understand are bribery, corruption and opportunism. They also enjoy killing each other—which does make staying alive a problem. In other words, Brataccas is a *very* rough neighborhood to go snooping around in.

This game comes on an auto-boot disk. While loading, some nice music plays to give you something to listen to. Then the screen prompts you to press any key to start. As the music fades, your screen changes to show Kyne appearing in the arrivals bay.

At this point you can start playing or press the [HELP] key to display the options menu. This menu is very important as it pauses the action, allows you to set up how you will control Kyne, and gives you the ability to save and restore a game. It also has a movie mode which puts Kyne on auto-pilot and he plays the game himself.

I found the animation to be quite good and smooth. The scenery is well thought out and detailed. You can even see another planet (moon? asteroid?) setting through a window. The city is fairly vast with lots of rooms to explore and quite a few to figure out how to to get into without dying.

Now the bad news. It seems obvious to me that the main programming effort for Brataccas was put into the animation and not into the player interface. If you buy the game, don't even bother trying to play it with a joystick or mouse. Controlling Kyne reliably with either of these in a critical situation is nearly impossible. And even with the keyboard it takes a *lot* of practice.

The animation slows down to a crawl if more than two characters are on screen at the same time. Another bothersome trait is that if you fall down from a raised area all the items you are carrying will drop to the floor and the other characters try to pick them up. (Some might consider this a feature, but I found it very annoying.)

If you want to pick up anything off the floor, you had better have patience. One time, it took me twenty tries to get an object off the floor. Objects are another irritation. Even though you are carrying the objects you cannot examine them, read them, or do anything else with them but drop them.

The authors say their interface "implies action," which means that the game tries to sense what you want to do and will proceed to do it for you. Most of the time for me, it meant running into walls at full speed.

Talking to other characters is another matter. You cannot speak to any other character unless they address you first. When you do get a chance to talk, don't be too near the other character as your ballon (just like in the comics) goes over the top of theirs so you end up guessing what the other was saying.

To sum it all up, for all its impressive graphics and hi-tech, Blade Runner plotline, I really can't say Brataccas is one of my favorites. It's too slow for arcade action and too limited for an adventure. It was fun, but less so than I would expect. On a scale of 1 to 10 I would have to give it a 5.

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BORROWED TIME

Activision, Inc.
P.O. Box 7287
Mountain View, CA 94039
(415) 960-0410
$49.95

Reviewed by Sol Guber

It's 1934. You are Sam Harlow, private eye. Nice guy, usually, but someone wants you dead. Guess who? Think fast. You're living on **Borrowed Time**.

Borrowed Time is an illustrated text adventure game that has several very nice gimmicks which set it above the average. The illustrations enhance both the story and the puzzle. Two essentials for solving the mystery are a map of the town and a dossier of the approximately 30 characters in this morality play.

Borrowed Time is very well written and much thought and effort went into making the game very playable. This version used all the Atari 520ST's strengths admirably.

There are over 100 pictures in this game and the graphics are excellent, subtly utilizing all 16 available colors to good advantage. Scenes are loaded from the disk when any room or area is observed. However, after a room is vacated the picture is still stored in RAM. So upon returning to a room, the picture appears instantly.

Due to the difficulty of the various puzzles, the picture appearing most often is the killer, a truly frightening thug. The second most common picture—of which there are five versions—are the tops of your scuffed, size-12 brogues. Harlow seems to like putting his foot into places where it does not belong—including his mouth.

There is a slight amount of animation in many of the pictures, as well as a sense of humor. For example, there is a blind newsstand vendor wearing dark glasses. Of course, his dog has dark glasses and wags his tail in the picture. Boss Farnham waves his finger at you, water glugs in the glass bottle, and the woman knitting in the doctor's office moves her knitting needles.

Activision has designed a nice mouse interface for their adventure games. The pictures use about two-thirds of the top half of the screen. There is a list on the right side of the screen of frequently used action and object words. Click on any of the words, and they appear within the typing area. The mouse can also be used to pick up and discard objects. Your inventory of objects is always displayed in a bar in the center of the screen.

Activision has also made the game even easier to play by using the function keys for shortcuts to perform many frequent actions. Function keys handle such things as: SAVE GAME, LOAD GAME, TELL ME ABOUT ______, DROP ______, QUICKSAVE, QUICKLOAD, etc. While this does not make the puzzle any easier, it does make for more convenient playing. QUICKSAVE, for example, should definitely be used if you hear someone breathing down your neck—or a gun being cocked—and you want to get away in a hurry. Remember, you are living on Borrowed Time.

Two disks come with this game. I wish to commend Activision for putting the saves on the second disk. It becomes cumbersome to have a two-disk game plus a third disk for saving the game.

Borrowed Time is a good adventure. It is of moderate difficulty. The pictures are excellent. The story is good. It will take a great deal of effort to solve the puzzle and see all the illustrations. The use of the mouse is very effective. The use of the list of words on the screen is distracting after a bit, but does save some typing. Activision has done an excellent job with Borrowed Time. You will spend many enjoyable hours in 1934.

New Products

Hippopotamus Software stopped by the **ST Resource** offices to demonstrate one of the hottest products we've seen for the ST yet, **HippoVision** (tentatively $139.95). Yes, it's a video digitizer that can digitize images from any standard video signal—TV, videocamera, VCR, etc. The beta test version that we saw worked in low or high resolution. The screen refresh rate was fast enough to actually watch moving digitized pictures on the ST. Any captured picture is saved in DEGAS or NEOchrome format for later fun. Also, HippoVision is the first product to use the ST cartridge port.

Hippopotamus Software, Inc., 985 University Avenue, Suite #12, Los Gatos, CA 95030. (408) 395-3190. BETA.

Major databases are beginning to appear for the ST. **H & D Base** ($99.95) from Mirage Concepts, is a relational database program compatible with dBase II. The fascinating twist to this product is that, because it is written in Forth, you can "turn on" the Forth language and program in Forth as well as dBase. You can also access GEM commands in this manner.

Mirage Concepts, 4055 W. Shaw, #108, Fresno, CA 93711. (800) 641-1441. In California (800) 641-1442. FINAL.

The Manager is a powerhouse relational database system from the Canadian firm of BMB Compuscience. Priced tentatively at $169.95 (with a $149.95 introductory tag), The Manager is described by its creators as a "paperless office" which will offer mainframe capability with virtually unlimited storage. This is no small software package. The Manager comes with *six* disks. And yet it can still be used on a 520ST with TOS in RAM.

BMB Compuscience Canada, Ltd., 500 Steeles Avenue, Milton, Ontario L9T 3P7, Canada. (416) 876-4741. PRESS.

ST books are beginning to appear in the bookstores. Compute! Publications has

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added to their list with **The Elementary Atari ST** ($16.95). This spiral-bound volume introduces new owners to their machines, then proceeds—mostly through BASIC examples—to explain graphics, disk I/O, printer use, and so on.

Compute! Publications, Inc., P.O. Box 5406, Greensboro, NC 27403. (919) 275-9809. FINAL.

For those interested in Modula-2, Hayden Books will be happy to get you started with their **Modula-2 Programming** ($21.95). This 223-page book is aimed at the "novice and experienced programmer alike." Though the book is not aimed at ST owners, there are enough generic programming examples to keep the Atari reader busy.

Hayden Book Company, 10 Mulholland Drive, Hasbrouck Heights, NJ 07604. (201) 393-6306. FINAL.

And Osborne/McGraw-Hill is jumping on the ST bandwagon with their introductory **Atari ST User's Guide** ($15.95). This book explains how to unpack your computer, how to move the mouse, and how to get about on the desktop. It goes on to demonstrate various uses of LOGO with several programming examples. At a slightly higher level, from the same company, is **The C Primer** ($17.95). This is a revised and updated 303-page version of the original volume by Les Hancock and Morris Krieger.

Osborne/McGraw-Hill, 2600 10th Street, Berkeley, CA 94710. (415) 548-2805. FINAL.

Abacus Software has announced several new books for the ST, including **Atari ST for Beginners, Atari ST Peeks and Pokes, Atari ST BASIC Training Guide, and Atari ST from BASIC to C**. All are $16.95, with the exception of the latter book, which is $19.95. Abacus is also releasing a revised version of their first volume, **Presenting the Atari ST** ($16.95).

Abacus Software, 2201 Kalamazoo S.E., Grand Rapids, MI 49510. (616) 241-5510. PRESS.

Mindshadow ($49.95), the Activision graphics adventure, is now available on the ST. This latest port from the 8-bit world starts on a mysterious—and hazardous—island and travels through swamps, jungles and caves. Danger galore!

Activision, Inc., P.O. Box 7286, Mountain View, CA 94039. (415) 960-0410. FINAL.

You say your mouse ball is getting dirty from rolling around on that gritty computer tabletop? Try the **Mouse Pad** ($9.50, plus $1.50 postage). According to its makers, this 8×9 1/2-inch foam pad enhances cursor control and reduces fatigue.

West Ridge Designs, 305 N.W. 12th Avenue, Portland, OR 97209. (503) 248-0053. FINAL.

David Beckemeyer Development Tools, makers of the UNIX-like Micro-C Shell, announces **MICRO RTX** ($69.95), a fully multi-tasking extension to GEMDOS. According to Beckemeyer, multiple TOS applications can be used concurrently with many background applications running while the foreground application is active.

David Beckemeyer Development Tools, 592 Jean Street #304, Oakland, CA 94610. (415) 658-5318. PRESS.

There's excitement in the graphics community! Migraph has completed **Easy Draw** ($149.95). This is an object-oriented graphics package which utilizes GEM perhaps more completely than any product available. Similar to GEMDraw, Easy Draw is a two-disk package that uses GDOS and Digital Research's virtual output system for the first time (more on this in later issues). Features include rubber banding, sizing and stretching boxes, multiple windows, multiple zoom, and more.

Migraph, 720 South 333rd Street, Suite 201, Federal Way, WA 98003. (206) 838-4677. FINAL.

And still more graphics. Bitmap, Inc. has compiled a disk collection of several NEOchrome pictures (many of which were digitized on a Macintosh and ported to the ST). Load them into your favorite paint package and color-fill them to your heart's content. The **Bitmap Coloring Book** is $18.95. Just be sure and stay within the lines.

Bitmap, Inc., Box 237, Westwego, LA 70094. (504) 891-4862. FINAL.

Supra Corporation has completed their series of hard drives for the ST. First available is be the 10MB drive—which was just sent to **ST Resource** for testing. This will soon be followed be 20, 30, and 60 megabyte drives. Prices are $799 for 10MB, $1095 for 20MB, $1495 for 30MB, and $1995 for 60MB.

Supra Corporation, 1133 Commercial Way, Albany, OR 97321. (503) 967-9081. FINAL.

Philon Fast/BASIC-M ($129) is now available, for those of you who find ST BASIC just a tad clumsy. This is a full compiler BASIC aimed, really, at the developer market. Six disks are included in the package and Philon recommends using a hard disk drive when using the product.

Philon, Inc., 641 Avenue of the Americas, New York, NY 10011. (212) 807-0303. FINAL.

The Mark Williams Company has a number of products coming out. First is a word processor, **Let's Write** ($79.95 until May 31 then $99.95). This is a "Micro Emacs" style text editor. Included in the package is a spelling checker and the Kermit telecommunications program. Also from Mark Williams is a new C compiler called **Let's C** ($75) and **csd** ($75), a C source debugger.

Mark Williams Company, 1430 W. Wrightwood, Chicago, IL 60614. (312) 472-6659. FINAL/PRESS/PRESS.

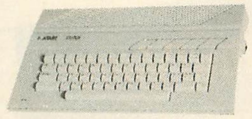
Lamar Micro has developed a **65C02 Cross Assembler** ($89.95) which will let you develop software for 8-bit, 6502 machines on your speedy 16-bit ST.

Lamar Micro, 2107 Artesia Boulevard, Redondo Beach, CA 90278. (213) 374-1673. PRESS.

*New ST product notices are compiled from information provided by the products' manufacturers. **Antic** assumes no responsibility for the accuracy of these notices or the performance of the product. Each mention is followed by a code word indicating that, at press time, **Antic** had seen a FINAL marketable version, near-final BETA, earlier ALPHA, incomplete DEMO, or PRESS release.*

ATARI SPECTACULAR

ATARI 65XE



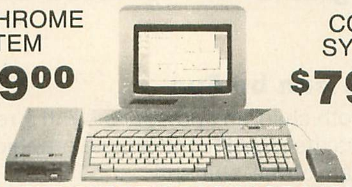
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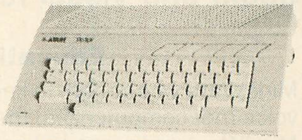
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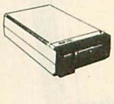


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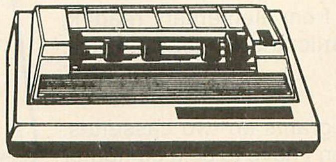
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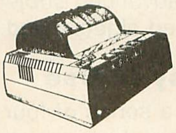
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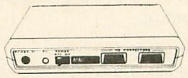
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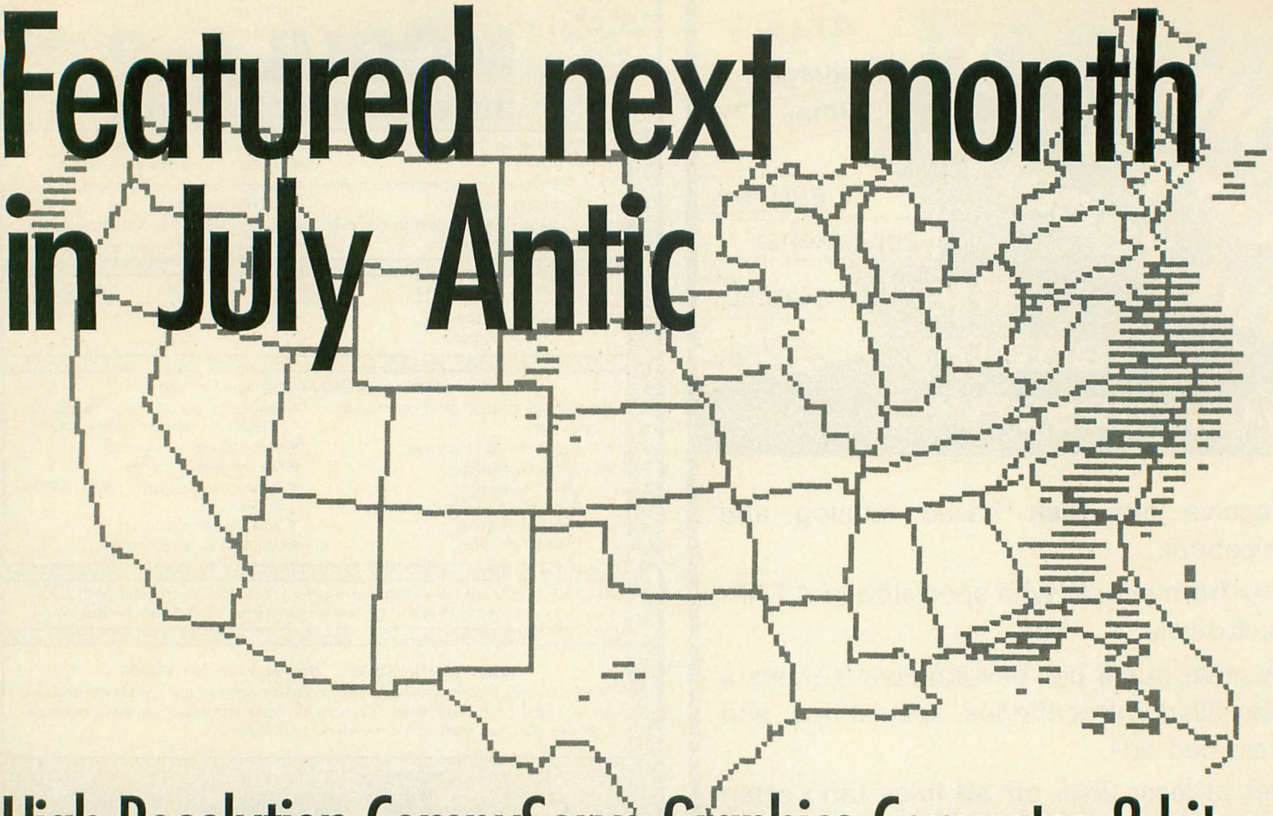
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Featured next month in July Antic



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SOFTWARE LIBRARY

Antic type-in listing section includes every full-length program from this issue.

DISK SUBSCRIBERS: Programs for 8-bit Atari computers can be used immediately. Just follow instructions in the accompanying magazine articles. ST Owners: See monthly disk's ST Help File for instructions on how to transfer programs to 3-1/2 inch disk.

Antic program listings are typeset on the Star SB-10 printer — from Star Micronics, Inc., 200 Park Avenue, New York, NY 10166.

TYPING SPECIAL ATARI CHARACTERS

Antic printed program listings leave a small space between each Atari Special Character for easier reading. Immediately below you will see the way **Antic** prints all the standard Atari letters and numbers, in upper and lower case, in normal and inverse video.

```
ABCDEFGHIJKLMNOPQRSTUVWXYZ
ABCDEFGHIJKLMNOPQRSTUVWXYZ
abcdefghijklmnopqrstuvwxyz
abcdefghijklmnopqrstuvwxyz
0123456789        0123456789
```

The Atari Special Characters and the keys you must type in order to get them are shown in the two boxes below.

NORMAL VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
♥	CTRL ,	●	CTRL T
	CTRL A		CTRL U
	CTRL B		CTRL V
	CTRL C		CTRL W
	CTRL D		CTRL X
	CTRL E		CTRL Y
	CTRL F		CTRL Z
	CTRL G		ESC ESC
	CTRL H	↑	ESC CTRL –
	CTRL I	↓	ESC CTRL =
	CTRL J	←	ESC CTRL +
	CTRL K	→	ESC CTRL *
	CTRL L	◆	CTRL .
	CTRL M	♠	CTRL ;
	CTRL N		SHIFT =
	CTRL O		ESC SHIFT CLEAR
♣	CTRL P	◀	ESC DELETE
	CTRL Q	▶	ESC TAB
	CTRL R		
	CTRL S		

INVERSE VIDEO

FOR THIS	TYPE THIS	FOR THIS	TYPE THIS
	⅄CTRL ,		⅄CTRL Y
	⅄CTRL A		⅄CTRL Z
	⅄CTRL B		ESC SHIFT DELETE
	⅄CTRL C		ESC SHIFT INSERT
	⅄CTRL D		ESC CTRL TAB
	⅄CTRL E		ESC SHIFT TAB
	⅄CTRL F		⅄CTRL .
	⅄CTRL G		⅄CTRL ;
	⅄CTRL H		⅄SHIFT =
	⅄CTRL I		ESC CTRL 2
	⅄CTRL J		ESC CTRL DELETE
	⅄CTRL K		ESC CTRL INSERT
	⅄CTRL L		
	⅄CTRL M		
	⅄CTRL N		
	⅄CTRL O		
	⅄CTRL P		
	⅄CTRL Q		
	⅄CTRL R		
	⅄CTRL S		
	⅄CTRL T		
	⅄CTRL U		
	⅄CTRL V		
	⅄CTRL W		
	⅄CTRL X		

Whenever the CONTROL key (CTRL on the 400/800) or SHIFT key is used, *hold it down* while you press the next key. Whenever the ESC key is pressed, *release* it before you type the next key.

Turn on inverse video by pressing the Reverse Video Mode Key ◪ . Turn it off by pressing it a second time. (On the 400/800, use the Atari Logo Key ⅄ instead.)

Among the most common program typing mistakes are switching certain capital letters with their lower-case counterparts—you need to look especially carefully at P, X, O and 0 (zero).

Some of Atari Special Characters are not easy to tell apart from standard alpha-numeric characters. Usually the Special Characters will be boxed. Compare the two sets of characters below:

SPECIAL			STANDARD		
		CTRL F	/		/
		CTRL G	\		SHIFT +
		CTRL N	—		SHIFT -
		CTRL R	-		–
		CTRL S	+		+

HOW TO USE TYPO II

TYPO II is the improved automatic proofreading program for **Antic's** type-in BASIC listings. It finds the exact line where you made a program typing mistake.

Type in TYPO II and SAVE a copy to disk or cassette. Now type GOTO 32000. When you see the instruction on the screen, type in a single program line **without the two-letter TYPO II code** at left of the line number. Press [RETURN].

Your line will reappear at the bottom of the screen with a two-letter TYPO II code on the left. If this code is not exactly the same as the line code printed in the magazine, you mistyped something in that line.

To call back any line previously typed, type an asterisk [*] followed (without in-between spaces) by the line number, then press [RETURN]. When the complete line appears at the top of the screen, press [RETURN] again. This is also the way you use TYPO II to proofread itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000.

To remove TYPO II from your program, type LIST "D:FILENAME",0,31999 [RETURN] (Cassette owners LIST "C:). Type NEW, then ENTER "D:FILENAME" [RETURN] (Cassette—ENTER "C:). Your program is now in memory without TYPO II and you can SAVE or LIST it to disk or cassette.

Owners of the BASIC XL cartridge from O.S.S. type SET 5,0 and SET 12,0 before using TYPO II.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "K":POSITION 11,1:? "TYPO II"

EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
```

Don't type the TYPO II Codes!

```
ET 32120 ? "K":POSITION 11,1:? " TYPO II 
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VV 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press  RETURN  and edit line a
   bove.":GOTO 32050
```

ERROR FILE

ATARI 'TOONS

August 1985

The 22nd character in line 1090 of listing 2 is an A. Also, to load non-standard character sets, change NUMBER=1024 in line 1140 to: NUMBER=2050, and change line 1150 to: 1150 GOTO 1170.

GUESS THAT SONG

July 1985

The September, 1985 HELP! section contains an easier-reading listing of some of the tougher data lines in Guess That Song.

STAR VENTURE

July 1985

Change line 380 to:

```
380 IF PEEK(53279
)=6 THEN SOUND 0,
0,0,0:GOTO 80
```

MUSICIAN

June 1985

Change line 790 to:

```
790 IF A=54 THEN
POSITION 4,22:? #
6;"song cleared":
GOTO 810
```

And if you're having tempo problems, remove line 1720 and add the following:

```
1715 IF A=14 THEN
 TEMPO=-0.25:GOTO
 1700
1720 REM REMOVE T
HIS LINE
```

MANEUVER

April 1985

If you get hearts on the title screen, LIST the program to disk or cassette, type NEW, then ENTER and SAVE it.

FONT MAKER FOR SG-10

March 1985

The July 1985 issue of ANTIC contains a listing which, when merged with FONT MAKER, makes that program work on the Star SG-10. See the HELP section of that issue for instructions.

CUSTOM PRINT

March 1985

Custom Print has problems printing certain characters using redefined characters. Change line 5 to:

```
5 CS=PEEK(106)-8:
POKE 106,CS-1:GRA
PHICS 0:DIM CST$(
20):CST$=""
```

MICRO JULIUS PERPETUAL CALENDAR

Article on page 39

LISTING 1

Don't type the TYPO II Codes!

```
RK 10 REM JULIAN CALENDAR
IJ 12 REM BY CHARLES POSTLE
GR 14 REM (c) 1986, ANTIC PUBLISHING
DM 20 DIM A$(62),C$(75)
JH 30 DIM M$(9),DAY$(9),I$(2)
BB 40 DIM T$(2),D$(2),B$(2)
GW 50 GRAPHICS 0:POKE 82,2
ZZ 60 ? "This program calculates a number
      of":? "answers relating to days and d
   ates"
FB 70 ? "between March 1, 1900 and Februa
   ry":? "28, 2100 using the Julian Day M
   ethod.":?
FM 80 SKIP=1:ERR=1:TRAP 84:? "ENTER DATE
   #1 (M,D,Y)":? :INPUT M,D,Y
RJ 82 GOSUB 1740
OP 84 IF ERR=1 THEN ? "↑↑↑";:GOTO 80
XQ 90 TRAP 40000:? :GOSUB 120
CD 95 JSAFE=JDN:SAFEDOW=DOW:SAFEM=M:SAFEY
   =Y:SAFED=D
OK 100 JDN1=JDN
OS 110 GOTO 180
GB 120 REM CALCULATE JULIAN DAY NUMBER
RA 130 IF M=1 THEN YY=(Y-1):M=(M+13):GOTO
     160
RM 140 IF M=2 THEN YY=(Y-1):M=(M+13):GOTO
     160
EX 150 IF M>2 THEN M=M+1:YY=Y
WJ 160 JDN=INT(365.25*YY)+INT(30.6001*M)+
   D
ZL 170 RETURN
XI 180 REM CONVERTS JULIAN DAY NUMBER TO
   DATE
MT 190 YY=INT((JDN-122.1)/365.25)
AS 200 M=INT((JDN-INT(365.25*YY))/30.6001
   )
DU 210 D=JDN-INT(365.25*YY)-INT(30.6001*M
   )
RU 220 IF M=14 THEN M=M-13:GOTO 250
SH 230 IF M=15 THEN M=M-13:GOTO 250
DE 240 IF M<14 THEN M=M-1:GOTO 250
XT 250 IF M>2 THEN Y=YY
UF 260 IF M=1 THEN Y=YY+1:GOTO 280
VT 270 IF M=2 THEN Y=YY+1
XI 280 GOSUB 1490
DV 290 REM CALCULATE DAY OF THE WEEK.
CU 300 DOW=(7*(((JDN+5)/7)-INT((JDN+5)/7)
   ))
QQ 310 DOW=1+INT(DOW+1.0E-03)
UV 320 GOSUB 1630
RX 330 IF G=2 THEN RETURN
UQ 340 REM PRINT M,D,Y & DOW
JP 350 ? M$;" ";D;", ";Y;"  ";DAY$
AN 360 IF G=1 THEN 680
UQ 370 GOSUB 1800
BF 380 FOR F=11 TO 22
IQ 390 POSITION 2,F:GOSUB 1720
EQ 400 NEXT F
VY 410 REM MENU
NE 420 POSITION 2,10
RL 430 ? :? "CHOOSE A CALCULATION:":?
KE 440 ? "1 ENTER A NEW DATE TO FIND THE
         DIFFERENCE IN DAYS?"
PV 450 ? "2 SUBTRACT A NUMBER OF DAYS FRO
   M THE  ABOVE DATE?"
VC 460 ? "3 ADD A NUMBER OF DAYS TO THE D
   ATE      ABOVE?"
EG 470 ? "4 CHOOSE A NEW DATE?"
XS 480 ? "5 END PROGRAM?"
EP 490 ? "6 DRAW CALENDAR?"
ED 500 ? "CHOICE>>";:CLOSE #1:OPEN #1,4,0
   ,"K:"
KS 510 GET #1,CH:SKIP=0
RX 520 IF CH<49 OR CH>54 THEN 510
NZ 530 CLOSE #1:CH=CH-48:? CH
ZV 540 FOR F=10 TO 21
UZ 550 POSITION 2,F
VE 560 GOSUB 1720
FF 570 NEXT F
OI 580 POSITION 2,11
EK 590 REM BRANCH TO CHOICE.
UT 600 ON CH GOTO 610,720,750,780,790,800
   :REM BRANCH ON CH
MW 610 ERR=1:TRAP 625:? "ENTER DATE #2 (M
   ,D,Y)":? :INPUT M,D,Y
VX 620 GOSUB 1740
UK 625 IF ERR=1 THEN ? "↑↑↑";:GOTO 610
WB 630 TRAP 40000:GOSUB 120
PF 640 JDN2=JDN
JB 650 JDND=ABS(JDN1-JDN2)
XB 660 G=1:POSITION 2,11:GOSUB 1720:GOSUB
     1720
PJ 670 GOTO 180
TJ 680 ? :? "DIFFERENCE=";JDND;" DAYS"
UX 690 GOSUB 1800
EY 700 G=0
PS 710 GOTO 380
OZ 720 ? "ENTER NUMBER OF DAYS TO BE SUBT
   RACTED"
LA 730 INPUT JDN2:JDN=JDN1-JDN2
PE 740 GOTO 180
AH 750 ? "ENTER NUMBER OF DAYS TO BE ADDE
   D"
JK 760 INPUT JDN2:JDN=JDN1+JDN2
PK 770 GOTO 180
RM 780 GOTO 50
JJ 790 ? "↖":END
MK 800 REM FINDS THE FIRST DAY OF THE MON
   TH.
CX 805 JDN1=JSAFE:DOW=SAFEDOW:M=SAFEM:Y=S
   AFEY:D=SAFED
ZY 810 W=D:D=1:G=2:GOSUB 120
HQ 820 JDN=JDN1:GOSUB 180
LS 830 DIF=DOW*2-1
RT 840 YEAR=Y
IR 850 REM FINDS THE FIRST DAY OF THE NEX
   T MONTH.
WI 860 M=M+1:IF M=13 THEN M=1:Y=Y+1
SF 870 GOSUB 120
YK 880 REM THE NUMBER OF DAYS ON THE CALE
   NDAR.
XP 890 E=JDN-JDN1
PA 900 REM ASSIGNS DAYS TO A$ MATRIX
CY 910 FOR X=1 TO E
QL 920 IF X<10 THEN B$(1,1)=" ":B$(2,2)=S
   TR$(X):A$(X*2-1,X*2)=B$:GOTO 950
GE 930 A$(X*2-1,X*2)="  "
UE 940 A$(X*2-1,X*2)=STR$(X)
MD 950 NEXT X
YW 960 REM FIGURES THE DAY TO BE HIGHLITE
   D.
EP 970 IF W<10 THEN T$=STR$(W):T=ASC(T$):
   D$(1,1)="■":D$(2,2)=CHR$(T+128):A$(W*2
   -1,W*2)=D$:GOTO 990
UO 980 T$=STR$(W):T=ASC(T$(1,1)):TT=ASC(T
   $(2,2)):D$(1,1)=CHR$(T+128):D$(2,2)=CH
   R$(TT+128):A$(W*2-1,W*2)=D$
XK 990 REM CLEARS THE LAST TWO DAYS OF TH
   E CALENDAR.
RA 1000 IF E=31 THEN GOTO 1040
```

```
UG 1010 FOR X=E*2+1 TO 62
TQ 1020 A$(X,X)=" "
LH 1030 NEXT X
GL 1040 REM ASSIGNS DAY OF WEEK SYMBOLS T
        O WEEK ONE.
BW 1050 FOR N=1 TO 7
ZR 1060 READ I$:C$(N*2-1,N*2)=I$
HN 1070 NEXT N
NY 1080 GOTO 1100
TA 1090 DATA SU,MO,TU,WE,TH,FR,SA
OB 1100 FOR N=8 TO 37
NG 1110 C$(N*2-1,N*2)="  "
HA 1120 NEXT N
NC 1130 REM MATCHES DAYS TO CALENDAR.
PL 1140 L=LEN(A$)
NL 1150 C$(DIF,L+DIF)=A$
MB 1160 REM PRINTS CALENDAR.
IO 1170 ? "↖":POKE 709,0:POKE 82,8
TB 1180 ? "                ";M$;",";YEAR
XB 1190 ? "┌──┬──┬──┬──┬──┬──┬──┐":? "│";
        :REM TOP
ZD 1200 FOR H=1 TO 7
TL 1210 ? C$(H*2-1,H*2);"│";
EO 1220 NEXT H
HH 1230 ? :? "├──┼──┼──┼──┼──┼──┼──┤":? "
        │";
IX 1240 FOR H=8 TO 14
TX 1250 ? C$(H*2-1,H*2);"│";
FA 1260 NEXT H
HT 1270 ? :? "├──┼──┼──┼──┼──┼──┼──┤":? "
        │";
RT 1280 FOR H=15 TO 21
UJ 1290 ? C$(H*2-1,H*2);"│";
EK 1300 NEXT H
HD 1310 ? :? "├──┼──┼──┼──┼──┼──┼──┤":? "
        │";
VF 1320 FOR H=22 TO 28
TT 1330 ? C$(H*2-1,H*2);"│";
EW 1340 NEXT H
HP 1350 ? :? "├──┼──┼──┼──┼──┼──┼──┤":? "
        │";
XR 1360 FOR H=29 TO 35
UF 1370 ? C$(H*2-1,H*2);"│";
FI 1380 NEXT H
AK 1390 ? :? "├──┼──┼──┴──┴──┴──┴──┘":? "
        │";
XM 1400 FOR H=36 TO 37
TP 1410 ? C$(H*2-1,H*2);"│";
ES 1420 NEXT H
PE 1430 ? :? "└──┴──┘":G=0
EO 1440 ? :? :? " MORE (Y-N)";:OPEN #1,4,
        0,"K:"
EL 1450 GET #1,YN
QE 1460 IF YN=89 THEN CLOSE #1:POKE 82,2:
        RUN
LV 1470 IF YN=78 THEN CLOSE #1:POKE 82,2:
        GRAPHICS 0:END
SD 1480 GOTO 1450
WL 1490 REM CONVERTS NUMBER TO MONTH.
UA 1500 ON M GOTO 1510,1520,1530,1540,155
        0,1560,1570,1580,1590,1600,1610,1620
IK 1510 M$="JANUARY":RETURN
AM 1520 M$="FEBRUARY":RETURN
QI 1530 M$="MARCH":RETURN
XI 1540 M$="APRIL":RETURN
HN 1550 M$="MAY":RETURN
OJ 1560 M$="JUNE":RETURN
XO 1570 M$="JULY":RETURN
XB 1580 M$="AUGUST":RETURN
PX 1590 M$="SEPTEMBER":RETURN
ZQ 1600 M$="OCTOBER":RETURN
UE 1610 M$="NOVEMBER":RETURN
DL 1620 M$="DECEMBER":RETURN
KY 1630 REM CONVERTS NUMBER TO DAY OF WEE
        K.
VN 1640 ON DOW GOTO 1650,1660,1670,1680,1
        690,1700,1710
UN 1650 DAY$="SUNDAY":RETURN
OW 1660 DAY$="MONDAY":RETURN
QU 1670 DAY$="TUESDAY":RETURN
IR 1680 DAY$="WEDNESDAY":RETURN
WE 1690 DAY$="THURSDAY":RETURN
JV 1700 DAY$="FRIDAY":RETURN
RY 1710 DAY$="SATURDAY":RETURN
QK 1720 ? "
           ":REM 37 SPACES
AW 1730 RETURN
CT 1740 ERR=0:REM VALID DATE?
VO 1750 IF Y<100 THEN Y=Y+1900
NF 1760 IF M<1 OR M>12 OR M<>INT(M) THEN
        ERR=1
UF 1770 IF Y<1900 OR Y>2100 OR Y<>INT(Y)
        THEN ERR=1
LZ 1780 IF D<0 OR D>31 OR D<>INT(D) THEN
        ERR=1
CL 1790 IF ERR=0 THEN 1798
ZW 1791 POKE 752,1:? "↑█BAD█DATE█ Try aga
        in."
KT 1792 FOR DL=1 TO 100:NEXT DL
DQ 1794 ? "↑                    "
WR 1798 POKE 752,0:RETURN
AC 1800 IF SKIP=1 THEN 1830
QL 1810 POKE 752,1:POKE 764,255:? :? "Pre
        ss any key to continue."
AP 1820 IF PEEK(764)=255 THEN 1820
CZ 1830 POKE 752,0:POKE 764,255:RETURN
```

business decision analysis techniques

DECIDE

Article on page 23

LISTING 1

Don't type the TYPO II Codes!

```
BX 10 REM DECISION ANALYSIS PROGRAM
HU 20 REM BY JEFFREY A. SUMMERS
GL 30 REM (c) 1986, ANTIC PUBLISHING
SD 40 GRAPHICS 0:BRK=1:IF PEEK(53279)=5 T
      HEN BRK=0
TO 50 GOTO 70
PF 60 IF BRK THEN POKE 16,112:POKE 53774,
      112:POKE 77,0
AG 65 RETURN
QZ 70 GRAPHICS 1:POSITION 6,7:? #6;"DECIS
      ION":POKE 752,1:POKE 710,0
SY 75 ? #6;"        TREE":? #6;"      ANA
      LYSIS":? :? "      By Jeffrey A. Sum
      mers"
JF 77 ? :? "      (c) 1986 Antic Publishi
      ng"
KR 80 GOSUB 60:GOTO 10000:REM INITIALIZE
DY 500 REM INPUT ERROR TRAP ROUTINE
PT 505 PRINT #1;CHR$(253);
HJ 510 PRINT #1;"Input error - please re-
       try"
LZ 515 TRAP 500
AN 520 GOTO PEEK(186)+256*PEEK(187)
BZ 600 REM FILE ERROR TRAP ROUTINE
PU 605 PRINT #1;CHR$(253);
MG 606 CLOSE #2
RQ 610 PRINT #1;"Error in file handling.
       Please Retry":GOSUB 20040
MK 615 TRAP 600
LL 620 GOTO 10040
```

continued on next page

```
BB 1000 REM NEW TREE SELECTION
RY 1004 REM CLEAR TREE
VI 1009 CLOSE #1:OPEN #1,4,0,"E:":GOSUB 6
   0:PRINT #1;"Clearing tree for entry...
   "
RU 1010 FOR I=1 TO 200:BPTR(I)=0:VALUE(I)
   =-1:NTYPE(I)=0:FOR J=1 TO 5
SE 1015 FPTR(I,J)=0:NEXT J:NEXT I:LABEL$=
   "":NODE=1:TOP=2
NX 1017 TRAP 500
JQ 1020 PRINT #1;"Node Types:":PRINT #1;"
   1 - Decision":PRINT #1;"2 - Chance"
DY 1025 PRINT #1;"3 - Terminal"
WT 1026 PRINT #1;"Type: ";:INPUT #1,TYPE
HB 1030 IF TYPE<1 OR TYPE>3 THEN 1020
HL 1035 NTYPE(NODE)=TYPE:? #1
CQ 1040 ON TYPE GOTO 1050,1100,1150
JY 1050 REM DECISION NODE
IW 1051 PRINT #1;"How many branches? ";:I
   NPUT #1,NBRANCH
DA 1055 IF NBRANCH>5 THEN PRINT #1;"Too m
   any. Regroup.":GOTO 1050
TX 1060 FOR I=1 TO NBRANCH:FPTR(NODE,I)=T
   OP:BPTR(TOP)=NODE:TOP=TOP+1:NEXT I
ZJ 1065 PRINT #1;"Label: ";:INPUT #1,RESP
   ONSE$
QT 1070 IF LEN(RESPONSE$)<20 THEN RESPONS
   E$(LEN(RESPONSE$)+1)=SPACE$
DU 1075 LABEL$(20*(NODE-1)+1,20*NODE)=RES
   PONSE$
OK 1080 GOTO 1200
GH 1100 REM CHANCE NODE
IJ 1101 PRINT #1;"How many branches? ";:I
   NPUT #1,NBRANCH
QA 1105 IF NBRANCH>5 THEN PRINT #1;"Too m
   any. Break it up.":GOTO 1100
BB 1110 FOR I=1 TO NBRANCH:PRINT #1;"Prob
    of branch ";I;" ":INPUT #1,PROBAB
WT 1115 FPTR(NODE,I)=TOP:BPTR(TOP)=NODE:P
   ROB(TOP)=PROBAB:TOP=TOP+1:NEXT I
SO 1120 GOTO 1065
MR 1150 REM TERMINAL NODE
GZ 1151 PRINT #1;"Value: ";:INPUT #1,V:VA
   LUE(NODE)=V:GOTO 1065
SO 1200 REM SELECT NEXT NODE
VI 1201 I=1
RC 1210 IF NTYPE(I)=0 THEN NODE=I:GOTO 12
   40
NV 1220 I=I+1:IF I=TOP THEN 10040
OM 1230 GOTO 1210
IK 1240 REM WIND BACK TO ORIGIN
PU 1241 PRINT #1;"Node # ";I;" from:":ND=
   I
QV 1250 N1=BPTR(ND)
DQ 1260 IF NTYPE(N1)=2 THEN PRINT #1;"Pro
   b ";PROB(ND);"  ";
WE 1270 PRINT #1;N1;"  ";LABEL$(20*(N1-1)
   +1,20*N1)
TZ 1280 IF N1=1 THEN GOSUB 20040:GOTO 102
   0
IK 1290 ND=N1:GOTO 1250
JP 2000 REM RETRIEVE TREE SECTION
NU 2004 TRAP 600
CP 2005 PRINT #1;"File to recover: ";:INP

   UT #1,RESPONSE$:GOSUB 20050
PV 2010 CLOSE #2:OPEN #2,4,0,RESPONSE$:GO
   SUB 60
MX 2020 INPUT #2,TOP
YB 2030 FOR I=1 TO TOP-1
TC 2040 INPUT #2,A:BPTR(I)=A
GW 2050 INPUT #2,A:VALUE(I)=A
NX 2060 INPUT #2,A:PROB(I)=A
UR 2070 INPUT #2,A:NTYPE(I)=A
HL 2080 FOR J=1 TO 5:INPUT #2,A:FPTR(I,J)
   =A:NEXT J
AT 2090 INPUT #2,RESPONSE$
QB 2100 IF LEN(RESPONSE$)<20 THEN RESPONS
   E$(LEN(RESPONSE$)+1)=SPACE$
IK 2110 LABEL$(20*(I-1)+1,(20*I))=RESPONS
   E$
WG 2120 NEXT I:? #1;"File has been read."
   :GOSUB 20040
GN 2130 CLOSE #2:GOTO 10040
YZ 3000 REM SAVE TREE SECTION
NU 3004 TRAP 600
GZ 3005 PRINT #1;"File to save to: ";:INP
   UT #1,RESPONSE$:GOSUB 20050
TK 3010 CLOSE #2:OPEN #2,8,0,RESPONSE$:GO
   SUB 60
TD 3020 PRINT #2;TOP
YC 3030 FOR I=1 TO TOP-1
FM 3040 PRINT #2;BPTR(I)
JC 3050 PRINT #2;VALUE(I)
AR 3060 PRINT #2;PROB(I)
VL 3070 PRINT #2;NTYPE(I)
PY 3080 FOR J=1 TO 5:PRINT #2;FPTR(I,J):N
   EXT J
FM 3090 PRINT #2;LABEL$(20*(I-1)+1,20*I)
MV 3100 NEXT I:? #1;"File has been saved.
   ":GOSUB 20040
GI 3110 CLOSE #2:GOTO 10040
WK 4000 REM EDIT TREE SECTION
AW 4004 CLOSE #1:OPEN #1,4,0,"E:":GOSUB 6
   0:TRAP 500
EL 4010 PRINT #1;"Node (0 to quit): ";:IN
   PUT #1,ENODE:IF ENODE=0 THEN 10040
WM 4015 EX=NTYPE(ENODE)
KS 4020 ON EX GOTO 4030,4200,4400
LP 4030 PRINT #1;"Options-":? #1:? #1;"0
   - Exit":? #1;"1 - Change label"
DS 4035 ? #1;"2 - Add Branch":? #1;"3 - D
   elete Branch"
EF 4040 ? #1:? #1;"Option: ";:INPUT #1,OP
   T
RE 4045 IF OPT>3 OR OPT<0 THEN 4030
VM 4050 IF OPT=0 THEN 4190
VJ 4055 ON OPT GOTO 4060,4080,4105
YS 4060 PRINT #1;"Label: ";:INPUT #1,RESP
   ONSE$
RN 4065 IF LEN(RESPONSE$)<20 THEN RESPONS
   E$(LEN(RESPONSE$)+1)=SPACE$
EU 4070 LABEL$(20*(ENODE-1)+1,20*ENODE)=R
   ESPONSE$
RA 4075 GOTO 4030
WM 4080 FOR I=1 TO 5:IF FPTR(ENODE,I)=0 T
   HEN POP :GOTO 4088
TD 4085 NEXT I:PRINT #1;"Too many banches
   ":GOTO 4030
XH 4088 I=1
YO 4090 IF FPTR(ENODE,I)<>0 THEN I=I+1:GO
   TO 4090
KE 4095 FPTR(ENODE,I)=TOP:BPTR(TOP)=ENODE
   :TOP=TOP+1
IY 4100 PRINT #1;"Done.":GOTO 1200
KL 4105 PRINT #1;"Branches to nodes numbe
   red:"
YJ 4110 FOR I=1 TO 5
GB 4112 IF FPTR(ENODE,I)<>0 THEN PRINT #1
   ;FPTR(ENODE,I);" ";LABEL$(20*(FPTR(ENO
   DE,I)-1)+1,20*FPTR(ENODE,I))
FR 4115 NEXT I
XN 4120 PRINT #1;"Cut branch to which nod
   e #? ";:INPUT #1,BRANCH
WF 4125 I=1
DK 4130 IF FPTR(ENODE,I)<>BRANCH THEN I=I
   +1:GOTO 4130
HC 4135 FPTR(ENODE,I)=0:PRINT #1;"Done.":
   GOTO 4030
RW 4190 IF EDFLG=0 THEN 4000
PM 4195 GOTO 1200
NA 4200 ? #1;"Options-":? #1:? #1;"0 - Ex
   it":? #1;"1 - Change label"
UL 4205 PRINT #1;"2 - Add Branch":PRINT #
   1;"3 - Delete Branch"
PC 4210 PRINT #1;"4 - Change Probabilitie
   s":PRINT #1
LY 4215 PRINT #1;"Option: ";:INPUT #1,OPT
   :IF OPT<0 OR OPT>4 THEN 4200
VH 4220 IF OPT=0 THEN 4190
HL 4225 ON OPT GOTO 4230,4250,4290,4320
YN 4230 PRINT #1;"Label: ";:INPUT #1,RESP
   ONSE$
RI 4235 IF LEN(RESPONSE$)<20 THEN RESPONS
   E$(LEN(RESPONSE$)+1)=SPACE$
EP 4240 LABEL$(20*(ENODE-1)+1,20*ENODE)=R
   ESPONSE$
QG 4245 GOTO 4200
VW 4250 I=1
GP 4255 IF FPTR(ENODE,I)=0 THEN 4270
AI 4260 I=I+1:IF I<5 THEN 4255
NZ 4265 PRINT #1;"Too many branches.":GOT
   O 4200
IY 4270 REM
HP 4275 FPTR(ENODE,I)=TOP:BPTR(TOP)=ENODE
   :REM FPTR
RT 4280 PRINT #1;"Probability: ";:INPUT #
   1,PROBAB
IV 4285 PROB(TOP)=PROBAB:TOP=TOP+1:GOTO 1
   200
BI 4290 PRINT #1;"Branches to nodes numbe
```

```
   red:":FOR I=1 TO 5
HN 4295 IF FPTR(ENODE,I)<>0 THEN PRINT #1
   ;FPTR(ENODE,I);" ";LABEL$(20*(FPTR(ENO
   DE,I)-1)+1,20*FPTR(ENODE,I))
EY 4300 NEXT I
GW 4302 PRINT #1;"Cut branch to which nod
   e # ";:INPUT #1,BRANCH
WD 4305 I=1
DG 4310 IF FPTR(ENODE,I)<>BRANCH THEN I=I
   +1:GOTO 4310
FE 4315 FPTR(ENODE,I)=0:PRINT #1;"Done.":
   GOTO 4200
QL 4320 PRINT #1;"NODE  PROB":FOR I=1 TO
   5:IF FPTR(ENODE,I)=0 THEN 4325
SR 4321 PRINT #1;FPTR(ENODE,I);"      ";PR
   OB(FPTR(ENODE,I));"  ";
UT 4322 PRINT #1;LABEL$(20*(FPTR(ENODE,I)
   -1)+1,20*FPTR(ENODE,I))
CV 4325 NEXT I:PRINT #1;"New probabilitie
   s to node #":FOR I=1 TO 5
DE 4330 IF FPTR(ENODE,I)=0 THEN 4340
FI 4335 ? #1;FPTR(ENODE,I);"  ";:INPUT #1
   ,PROBAB:PROB(FPTR(ENODE,I))=PROBAB
FK 4340 NEXT I
QI 4345 GOTO 4200
NE 4400 ? #1;"Options-":? #1:? #1;"0 - Ex
   it":? #1;"1 - Change label"
VI 4405 ? #1;"2 - Change value":? #1
ZD 4407 ? #1;"Option: ";:INPUT #1,OPT
SH 4410 IF OPT<0 OR OPT>2 THEN 4400
NR 4415 IF OPT=0 THEN 4000
VM 4420 IF OPT=2 THEN 4450
ZI 4425 PRINT #1;"Label: ";:INPUT #1,RESP
   ONSE$
QS 4430 IF LEN(RESPONSE$)<20 THEN RESPONS
   E$(LEN(RESPONSE$)+1)=SPACE$
FK 4435 LABEL$(20*(ENODE-1)+1,20*ENODE)=R
   ESPONSE$
QO 4440 GOTO 4400
NV 4450 ? #1;"New Value: ";:INPUT #1,V
FB 4455 VALUE(ENODE)=V:GOTO 4400
CR 5000 REM SOLVE TREE SECTION
NM 5004 TRAP 500
KH 5010 PRINT #1;"Minimize (0) or Maximiz
   e(1): ";:INPUT #1,MM
YB 5020 FOR I=1 TO TOP-1
MD 5030 IF NTYPE(I)<>3 THEN VALUE(I)=-1
FW 5035 NEXT I
YH 5040 FOR I=1 TO TOP-1
QT 5050 CNODE=I:REM CURRENT NODE
SM 5060 IF NTYPE(CNODE)<>3 THEN 5230
LW 5070 CNODE=BPTR(CNODE):IF CNODE=0 THEN
   POP :GOTO 5240
ZE 5080 IF NTYPE(CNODE)=2 THEN 5180
DH 5090 V=-1:IF MM=0 THEN V=10^90
YR 5100 FOR J=1 TO 5
CN 5110 IF FPTR(CNODE,J)=0 THEN 5150
RS 5120 IF VALUE(FPTR(CNODE,J))=-1 THEN P
   OP :GOTO 5230
UQ 5130 IF MM=1 AND V<VALUE(FPTR(CNODE,J)
   ) THEN V=VALUE(FPTR(CNODE,J))
VT 5140 IF MM=0 AND V>VALUE(FPTR(CNODE,J)
   ) THEN V=VALUE(FPTR(CNODE,J))
FV 5150 NEXT J
HR 5160 VALUE(CNODE)=V:GOTO 5070
YW 5180 V=0
AJ 5185 FOR J=1 TO 5
SN 5190 IF VALUE(FPTR(CNODE,J))=-1 THEN P
   OP :GOTO 5230
EK 5200 V=V+PROB(FPTR(CNODE,J))*VALUE(FPT
   R(CNODE,J))
FL 5210 NEXT J
HH 5220 VALUE(CNODE)=V:GOTO 5070
FG 5230 NEXT I
GT 5240 PRINT #1;"Solved.":GOSUB 20040
RH 5250 GOTO 10040
XD 6000 REM PRINT THE TREE SECTION
NY 6004 TRAP 600
FE 6010 PRINT #1;"Output to: ";:INPUT #1,
   RESPONSE$:GOSUB 20050
TQ 6020 CLOSE #2:OPEN #2,8,0,RESPONSE$:GO
   SUB 60
YF 6030 FOR I=1 TO TOP-1
ZN 6040 PRINT #2;"Node # ";I;"  ";LABEL$(
   20*(I-1)+1,20*I)
LS 6050 EX=NTYPE(I):ON EX GOTO 6060,6130,
   6200
LW 6060 ? #2;"   Decision   Value= ";VALU
   E(I)
ZY 6070 ? #2;" From node # ";BPTR(I);
VB 6075 IF BPTR(I)<>0 THEN PRINT #2;"  ";
   LABEL$(20*(BPTR(I)-1)+1,20*BPTR(I));
ZZ 6077 ? #2
ZO 6080 FOR J=1 TO 5
AO 6090 IF FPTR(I,J)=0 THEN 6110
CZ 6100 PRINT #2;" To node # ";FPTR(I,J);
   "  ";LABEL$(20*(FPTR(I,J)-1)+1,20*FPTR
   (I,J))
FK 6110 NEXT J
YR 6120 PRINT #2:GOTO 6220
QB 6130 PRINT #2;"   Chance     Value= ";
   VALUE(I)
MS 6140 PRINT #2;" From node # ";BPTR(I);
   "  ";LABEL$(20*(BPTR(I)-1)+1,20*BPTR(I
   ))
ZH 6150 FOR J=1 TO 5
HV 6160 IF FPTR(I,J)=0 THEN 6180
GT 6170 PRINT #2;" To node # ";FPTR(I,J);
   " Prob: ";PROB(FPTR(I,J));" ";LABEL$(2
   0*(FPTR(I,J)-1)+1,20*FPTR(I,J))
GF 6180 NEXT J
ZM 6190 PRINT #2:GOTO 6220
QR 6200 ? #2;"   Terminal   Value= ";VALU
   E(I)
RH 6210 ? #2;" From node # ";BPTR(I);"  "
   ;LABEL$(20*(BPTR(I)-1)+1,20*BPTR(I))
FE 6220 NEXT I
RY 6230 CLOSE #2:GOSUB 20040
RF 6240 GOTO 10040
NZ 10000 REM INITIALIZE SECTION
KM 10010 DIM FPTR(200,5),BPTR(200),VALUE(
   200),NTYPE(200),PROB(200)
XA 10020 DIM LABEL$(4000),RESPONSE$(20),S
   PACE$(20),TEMP$(22)
FD 10025 VALUE(0)=0:PROB(0)=0
FA 10030 SPACE$="                    ":RE
   M 20 SPACES
RU 10035 FOR I=1 TO 200:NTYPE(I)=0:NEXT I
   :REM INIT NTYPE
OD 10040 GRAPHICS 0:CLOSE #1:OPEN #1,4,0,
   "E:":GOSUB 60
WZ 10041 REM OPEN SCREEN FOR I/O
CY 10050 PRINT #1;"Decision Analysis Prog
   ram":PRINT #1:PRINT #1;"Options:"
RV 10055 TRAP 500
LE 10060 PRINT #1;"0 - Exit":PRINT #1;"1
   - New Tree":PRINT #1;"2 - Recover Tree
   "
RI 10070 PRINT #1;"3 - Save Tree":PRINT #
   1;"4 - Edit Tree":PRINT #1;"5 - Solve
   Tree"
DX 10080 PRINT #1;"6 - Print Tree":PRINT
   #1
NB 10085 POSITION 2,11:PRINT #1;"Option:
   ";:INPUT #1,OPT
BC 10090 IF OPT<0 OR OPT>6 THEN 10040
FK 10100 IF OPT=0 THEN 20000
SA 10110 ? #1:ON OPT GOTO 1000,2000,3000,
   4000,5000,6000
HL 20000 POSITION 2,13:? #1:? #1;"Are you
    sure you want to exit? (Y/N)";:INPUT
   #1,RESPONSE$
NQ 20010 IF RESPONSE$="Y" THEN GRAPHICS 0
   :END
BR 20020 IF RESPONSE$="N" THEN 10040
WF 20030 GOTO 20000
CB 20040 FOR I=1 TO 150:NEXT I:RETURN
CB 20050 IF LEN(RESPONSE$)>1 THEN IF RESP
   ONSE$(2,2)=":" THEN 20080
GS 20060 IF LEN(RESPONSE$)>2 THEN IF RESP
   ONSE$(3,3)=":" THEN 20080
OG 20070 TEMP$="D:":TEMP$(3)=RESPONSE$:RE
   SPONSE$=TEMP$
EE 20080 RETURN
```

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calculates those ingredient changes

RECIPE CONVERTER

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LISTING 1

Don't type the TYPO II Codes!

```
DI 10 REM RECIPE MULTIPLIER
UM 20 REM BY JAMES W. BROWN
GL 30 REM (c) 1986, ANTIC PUBLISHING
SD 40 GRAPHICS 0:BRK=1:IF PEEK(53279)=5 T
   HEN BRK=0
LU 50 GOTO 100
PF 60 IF BRK THEN POKE 16,112:POKE 53774,
   112:POKE 77,0
ZX 70 RETURN
KD 100 DIM FRAC(22):REM DECIML FRACTIONS
XY 101 DIM FR$(110):REM STRING FRACTIONS
QW 102 DIM T$(5),TA$(15):REM INPT SCRTCH
TI 103 DIM E$(45),M$(30):REM UNITS ABBRV
WB 104 DIM EA$(135),MA$(90):REM UNITSTXT
WW 105 DIM ECON(9),MCON(6):REM CONV FACT
DE 106 DIM UCON(2):REM ENG TO MET VOL,WT
MA 130 DIM I$(38):REM INPUT ING. SCRATCH
SG 131 DIM ING$(1140):REM INGREDIENTS
IZ 132 DIM INGUNX(30):REM ING UNITS INDX
LO 133 DIM INGQUN(30):REM ING QUANTITY
AV 134 DIM RECIPE$(38):REM RECIPE NAME
VM 135 DIM FILENAME$(15)
OK 137 GOSUB 60:CLEAR=40000:REM CLEAR TRA
   PS
ZZ 138 NUMNOT=56:REM # NOTES IN THEME
JJ 140 DIM TITL$(20),CPRT$(32),CON(52)
KT 142 DIM THEME(NUMNOT),CH1(7),CH2(7)
GK 200 DATA .125,.25,.33333,.375,.5,.625,
   .66667,.75,.875,1.,1.25,1.33333
EM 202 DATA 1.5,1.66667,1.75,2.,2.25,2.33
   333,2.5,2.66667,2.75,3.
JU 210 DATA 1/8  ,1/4  ,1/3  ,3/8  ,1/2
   ,5/8  ,2/3  ,3/4  ,7/8  :REM NO QUOTS
PX 212 DATA 1    ,1 1/4,1 1/3,1 1/2,1 2/3
   ,1 3/4
RK 214 DATA 2    ,2 1/4,2 1/3,2 1/2,2 2/3
   ,2 3/4,3    :REM
XB 220 DATA tsp. ,tbsp.,fl.oz,c.   ,pt.
   ,qt.  ,gal. ,oz.  ,lb.  :REM ENGLISH
LS 230 DATA ml.  ,cl.  ,dl.  ,l.   ,g.
   ,kg.  :REM METRIC
GT 240 DATA teaspoon(s)    :REM
PE 241 DATA tablespoon(s)  :REM
HH 242 DATA fluid ounces   :REM
ZG 243 DATA cup(s)         :REM
SF 244 DATA pint(s)        :REM
NW 245 DATA quart(s)       :REM
XX 246 DATA gallon(s)      :REM
JH 247 DATA ounce (net wt.):REM
JX 248 DATA pound(s)       :REM
BW 250 DATA milliliter (ml):REM
KF 251 DATA centiliter     :REM
YB 252 DATA deciliter      :REM
YI 253 DATA liter          :REM
XN 254 DATA gram (g or gm.):REM
GF 255 DATA kilogram (kilo):REM
AG 260 DATA 1,3,6,48,96,192,768,1,16
CM 270 DATA 1,10,100,1000,1,1000
NE 310 DATA -32,0,0,128,160,32,0,128,-32,
   0,0,0,32,128,160,128,160,0,32,160
OW 311 DATA 0,128,160,32,0,128,0,32,0,128
   ,160,32,0,128,0,-32
BR 312 DATA -32,128,160,32,128,160,-32,12
   8,128,-32,128,160,32,128,160,0
ES 314 REM NOTES FOR THEME--
TR 315 DATA 121,96,81,60,40,47,40,60,91,7
   2,60,45,29,35,29,45
PI 316 DATA 243,193,162,121,81,96,81,121,
   182,144,121,108,121,108,91,182
WP 317 DATA 121,108,96,91,81,72,64,60,60,
   64,72,81,91,96,108,121
SW 318 DATA 121,108,96,91,81,72,64,121
MU 320 DATA 243,182,60,45,243,60,243
EZ 321 DATA 193,144,47,35,193,47,193
PN 1000 REM MAIN PROGRAM
SV 1010 GOSUB 1100:REM LOAD ARRAYS
XN 1015 GOSUB 1200:REM TITL SCREEN
UZ 1020 GOSUB 1300:REM INTRO
AR 1025 GOSUB 1400:REM STEP 1-INP.UNITS
ZC 1027 IF INDISK>0 THEN GOSUB 3000:GOTO
   1035
YY 1030 GOSUB 1600:REM STEP 2-ENTER RECP
AH 1035 GOSUB 1500:REM STEP 3-MULTIPLIER
WZ 1040 GOSUB 2500:REM STEP 4-OUT.UNITS
XJ 1045 GOSUB 2600:REM STEP 5-NEW RECIPE
XB 1050 GOSUB 2900:REM WRAPUP MENU
XB 1055 ON WRAP GOTO 1045,1075,1080,1085,
   1020,1065,1070,1095
FF 1060 END
NR 1065 GOSUB 3500:GOTO 1050:REM SAVE
GS 1070 GOSUB 3100:GOTO 1050:REM PRINT
PF 1075 GOSUB 1500:GOTO 1045:REM CHG MULT
   , RECOMPUTE
SX 1080 UO=3-UO:GOTO 1045:REM CHANGE OUTP
   UT UNITS METRIC<->ENGLISH
WS 1085 GOSUB 7000:GOTO 1050:REM CHANGE A
   N INGREDIENT
IN 1095 GOSUB 1200:REM FINALE
GY 1099 END
KJ 1100 REM LOAD ARRAYS
FB 1102 POKE 752,1:POSITION 10,10:? ">";
RN 1105 RESTORE 200:FOR I=1 TO 22:READ F:
   FRAC(I)=F:NEXT I:? ">";
DF 1110 RESTORE 210:FOR I=1 TO 22:READ T$
   :FR$(5*I-4)=T$:NEXT I:? ">";
FG 1115 RESTORE 220:FOR I=1 TO 9:READ T$:
   E$(5*I-4)=T$:NEXT I:? ">";
NV 1120 RESTORE 230:FOR I=1 TO 6:READ T$:
   M$(5*I-4)=T$:NEXT I:? ">";
WM 1125 RESTORE 240:FOR I=1 TO 9:READ TA$
   :EA$(15*I-14)=TA$:NEXT I:? ">";
FJ 1130 RESTORE 250:FOR I=1 TO 6:READ TA$
   :MA$(15*I-14)=TA$:NEXT I:? ">";
RM 1135 RESTORE 260:FOR I=1 TO 9:READ F:E
   CON(I)=F:NEXT I:? ">";
ZT 1140 RESTORE 270:FOR I=1 TO 6:READ F:M
   CON(I)=F:NEXT I:? ">";
ZS 1145 RESTORE 310:FOR I=1 TO 52:READ J:
   CON(I)=J:NEXT I:? ">";
HD 1150 RESTORE 315:FOR I=1 TO NUMNOT:REA
   D J:THEME(I)=J:NEXT I:? ">";
AY 1155 RESTORE 320:FOR I=1 TO 7:READ J:C
   H1(I)=J:NEXT I:? ">";
DK 1157 RESTORE 321:FOR I=1 TO 7:READ J:C
   H2(I)=J:NEXT I:? ">";
EN 1160 UCON(0)=1:ECON(0)=1:MCON(0)=1
XZ 1165 UCON(1)=943.6/192:REM ML/TSP
UH 1170 UCON(2)=454/16:REM G/OZ
WI 1175 FILENAME$="P:":? ">"
YD 1180 GOSUB 60
LT 1185 TITL$="  RECIPE  MULTIPLIER"
FV 1190 CPRT$=" ANTIC MAGAZINE  JAMES W.
   BROWN "
CM 1199 RETURN
PZ 1200 REM TITLE PAGE
BM 1220 GRAPHICS 18:ROW=2:GOSUB 60
YO 1230 FOR I=1 TO 20:COL=I+4
HL 1235 IF I>10 THEN COL=COL-10:ROW=4
FP 1240 COLOR ASC(TITL$(I))+CON(I)
TZ 1245 PLOT COL,ROW
FI 1250 NEXT I
FU 1255 ROW=8
XY 1260 FOR I=1 TO 32:COL=I+1
ZS 1265 IF I>16 THEN COL=COL-16:ROW=10
AZ 1270 COLOR ASC(CPRT$(I))+CON(I+20)
UI 1275 PLOT COL,ROW
GU 1278 NEXT I
```

```
LE 1280 FOR C=1 TO NUMNOT
ZK 1281 I=INT((C+7)/8)
NX 1282 SOUND 0,THEME(C),10,8
TL 1283 SOUND 1,CH1(I),10,8:SOUND 2,CH2(I
 ),10,8
FX 1285 SETCOLOR 0,C,8:SETCOLOR 1,C+2,8:S
 ETCOLOR 2,C+4,8:SETCOLOR 3,C+6,8
RX 1290 FOR D=1 TO 16:NEXT D
EA 1295 NEXT C
AO 1298 FOR I=0 TO 2:SOUND I,0,0,0:NEXT I

CO 1299 RETURN
RK 1300 GRAPHICS 0:POKE 752,1:GOSUB 60:RE
 M INTRO
FW 1305 ? "↖RECIPE MULTIPLIER helps you i
 ncrease":? "or decrease your favorite
 recipes."
CC 1310 ? :? "Here are the steps:":?
JO 1315 ? "1. Decide whether the original
 recipe"
DG 1316 ? "   uses English or Metric unit
 s.":?
AR 1320 ? "2. Enter the recipe into the c
 omputer"
LN 1321 ? "   (Enter up to 30 ingredients
 .)":?
TN 1325 ? "3. Decide by how much you want
 to"
MB 1326 ? "   increase or decrease the re
 cipe.":?
SP 1330 ? "4. Decide whether you want the
 new"
YM 1331 ? "   version in English or Metri
 c.":?
HV 1335 ? "5. The computer will give you
 the new"
TO 1336 ? "   recipe quantities. Jot them
 down"
WA 1337 ? "   in the margin of your cookb
 ook.":?
ZC 1340 PRT=0:CLOSE #3:S1=0:INDISK=0
BP 1345 GOSUB 8010
RI 1355 ? "↖PRELIMINARIES":?
VJ 1360 ? "Before beginning, you will fin
 d it":? "helpful to examine your recip
 e to"
GE 1365 ? "find ALL the ingredients. Most
 cook-":? "books are careful to list a
 ll the"
GD 1370 ? "ingredients in one place. Howe
 ver,":? "sometimes you will find a few
 hiding"
KG 1375 ? "down in the cooking instructio
 ns."
AH 1380 ? :? "When you have found all the
 ingre-":? "dients, mark each one with
 a number,"
HD 1385 ? "starting with 1. This will hel
 p you":? "keep track of where you are.
 ":?
IW 1399 GOSUB 8010:RETURN
IN 1400 REM INPUT UNITS
XQ 1405 ? "↖SELECT INPUT UNITS":?
ME 1410 ? "If your original recipe is in"

HS 1415 ? "U.S. (ENGLISH) units,       en
 ter ■E■":?
BK 1420 ? "If it is in METRIC units,   en
 ter ■M■":?
KB 1422 ? "To load a recipe from DISK, en
 ter ■D■":?
UL 1425 ? "If you need HELP to decide, en
 ter ■H■":?
MY 1430 ? "(Enter only one letter.)":?
VU 1435 ? "Always press RETURN after ever
 y entry."
AW 1440 GOSUB 8100
TN 1445 IF T$="E" THEN UI=1:RETURN
XU 1450 IF T$="M" THEN UI=2:RETURN
FS 1455 IF T$="D" THEN INDISK=1:RETURN
DR 1460 IF T$<>"H" THEN GOSUB 8030:GOTO 1
 400
KC 1470 REM HELP FOR ENGLISH/METRIC/DISK
VP 1472 ? "↖If your recipe contains thing
 s like":? "cups, ounces, pounds, or te
 aspoons,"
RA 1474 ? "it is ENGLISH.":?
LQ 1476 ? "If it contains things like gra
 ms,":? "kilograms (kilos), milliliters
 (ml),"
UY 1478 ? "liters, it is METRIC.":?
KV 1480 ? "If there are some of each, tak
 e your":? "cookbook back to the bookst
 ore for a"
XD 1482 ? "refund.  The recipes are proba
 bly":? "no good anyway.":?
WC 1484 ? "If you have previously used th
 is":? "program to save a recipe to dis
 k,"
LU 1486 ? "you can read it back and work
 on it.":?
WF 1490 GOSUB 8010:GOTO 1400
HQ 1500 REM MULTIPLIER
CC 1505 ? "↖CHOOSE MULTIPLIER":?
AC 1507 ? "Here you must decide how much
 you":? "want to increase or decrease y
 our"
QV 1508 ? "recipe by.  For example, if yo
 u want":? "to double it, the multiplie
 r is 2.":?
HT 1510 ? "There are two ways to choose t
 he":? "multiplier:":?
MT 1515 ? "Enter ■M■ if you know what mul
 tiplier":? "         you want, or":?
GD 1520 ? "Enter ■S■ if you know how many
 ":? "        servings you want.":?
BM 1525 GOSUB 8100
LF 1526 IF T$="M" THEN 1550
LU 1527 IF T$<>"S" THEN GOSUB 8030:GOTO 1
 500
ZV 1530 REM BY SERVINGS
TB 1532 S2=1:IF S1>0 THEN 1540
QC 1534 S1=1
PC 1535 ? "↖":? :? "How many servings doe
 s your":? "original recipe make";
SQ 1537 TRAP 1590:INPUT S1:TRAP CLEAR
CN 1538 IF S1<1 THEN ? "PLEASE ENTER A NU
 MBER AT LEAST 1.":GOSUB 8030:GOTO 1530

GY 1540 ? :? "How many servings do you wa
 nt":? "to make";
VO 1542 TRAP 1595:INPUT S2:TRAP CLEAR
FD 1543 IF S2<1 THEN ? "PLEASE ENTER A NU
 MBER AT LEAST 1.":GOSUB 8030:GOTO 1540

PL 1545 M=S2/S1:GOTO 1598
FK 1550 REM BY NUMBER
CS 1555 ? "↖Select the multiplier you wan
 t by":? "entering the letter in front
 of it:":?
GA 1559 A=ASC("A")
NS 1560 FOR I=1 TO 11:I5=I*5
UZ 1562 ? CHR$(I-1+A);"- ";FR$(I5-4,I5);"
   ";CHR$(I+10+A),"- ";FR$(I5+51,I5
 +55)
GH 1564 NEXT I
SE 1566 ? "              W-Enter as a dec
 imal":?
FM 1568 ? "Letter for selection";:T$="?":
 GOSUB 8100
FV 1570 IF T$>="A" AND T$<="V" THEN M=FRA
 C(ASC(T$)-A+1):GOTO 1598
VX 1575 IF T$<>"W" THEN GOSUB 8030:GOTO 1
 550
QM 1580 ? "How much do you want to":? "mu
 ltiply the recipe by";
WA 1582 TRAP 1596:INPUT M:TRAP CLEAR
ZT 1585 GOTO 1598
JU 1590 TRAP CLEAR:GOSUB 8020:GOTO 1535
EZ 1595 TRAP CLEAR:GOSUB 8020:GOTO 1540
KN 1596 TRAP CLEAR:GOSUB 8020:GOTO 1580
ST 1598 ? :? "The multiplier is ";M:GOSUB
 8000
CU 1599 RETURN
WL 1600 REM RECIPE
BK 1605 PRINT "↖ENTER RECIPE":?
AA 1610 ? "In this step you will enter th
 e":? "ingredients for your recipe:"
FW 1615 ? :? "-Enter the AMOUNT of each i
 ngredient."
WJ 1617 ? :? "-Enter the UNITS it is meas
 ured with."
VC 1620 ? :? "-Enter the NAME, so you wil
 l know":? " what the later results mea
 n."
RI 1622 ? :? "-Verify or modify the entry
 .  If you":? " make a mistake, you wil
 l have a"
LQ 1625 ? " chance to fix it before going
 on.":? " You will also have a chance
 to make"
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XS 1627 ? " changes at the end, and revie
   w the":? " results."
AQ 1630 ? :? "There will be a separate sc
   reen to":? "lead you through each of t
   hese steps.":?
BS 1635 GOSUB 8010
LI 1640 ? "K":? :? "Each ingredient has 3
    parts--":?
IN 1642 ? "Quantity"
NQ 1644 ? " I          Units"
ZF 1646 ? " I          I        Name"
YH 1648 ? "----     ----     ----------- "
OG 1650 ? " 1/2     cup      sugar"
VE 1652 ? " 3                eggs"
DU 1654 ? " 1/8     tsp.     salt"
XF 1656 ? " 1                can condensed mil
   k"
NL 1658 ? :? "Notice that some items do n
   ot":? "have units (eggs, can, etc.)."
GG 1660 ? "When you have things like this
   ,":? "select 'piece' for the units."
GO 1665 ? :GOSUB 8010:PRT=0:ING=1
FL 1670 REM INGREDIENT LOOP
ND 1675 GOSUB 7100:REM ENTER AN INGRED.
ME 1677 IF QUAN=0 THEN ING=ING-1:GOTO 169
   9
AO 1680 IF ING>=30 THEN 1699
UX 1685 ING=ING+1:GOTO 1670
WI 1699 NING=ING:RETURN
OV 1700 REM QUANTITY
LA 1705 ? "KQUANTITY FOR INGREDIENT ";ING
   :?
SD 1710 ? "Select the quantity you want b
   y":? "entering the letter in front of
    it:":?
EY 1714 A=ASC("A")
OB 1715 FOR I=1 TO 11:I5=I*5
UJ 1720 ? CHR$(I-1+A);"- ";FR$(I5-4,I5);"
        ";CHR$(I+10+A);"- ";FR$(I5+51,I5
   +55)
GD 1725 NEXT I
RW 1730 ? "                   W-Enter as a dec
   imal"
LE 1735 ? "                   X-Show previous
    entry"
UG 1740 ? "                   Z-No more ingred
   ients"
EU 1750 A=ASC("A")
DA 1755 ? :? "Letter for selection";:GOSU
   B 8100
DD 1760 IF T$>="A" AND T$<="V" THEN QUAN=
   FRAC(ASC(T$)-A+1):GOTO 1798
YX 1765 IF T$<>"X" THEN 1770
YA 1766 IF ING<2 THEN ? "THERE IS NO PREV
   IOUS INGREDIENT.":GOSUB 8030:GOTO 1700
XU 1768 ING=ING-1:GOSUB 2100:GOSUB 8010:I
   NG=ING+1:GOTO 1700
YM 1770 IF T$="Z" THEN QUAN=0:GOTO 1799
GP 1775 IF T$<>"W" THEN ? "Please enter o
   ne of the letters above.":GOSUB 8030:G
   OTO 1750
UF 1780 ? "What is the quantity";
JD 1782 TRAP 1790:INPUT QUAN:TRAP CLEAR
AV 1785 GOTO 1798
MJ 1790 TRAP CLEAR:GOSUB 8020:GOTO 1780
NC 1798 ? "The quantity is ";QUAN:GOSUB 8
   000
CY 1799 RETURN
OZ 1900 REM GET UNITS
OI 1905 ? "KENTER UNITS FOR INGREDIENT ";
   ING:?
QC 1910 ? "Select the measuring unit you
   want by":? "entering the letter in fro
   nt of it:":?
FJ 1915 A=ASC("A"):I2=12-3*UI:REM LOOP LI
   MIT 6 FOR METRIC, 9 FOR ENGLISH
UR 1920 FOR I=1 TO I2
OU 1922 I15=I*15:TA$=EA$(I15-14,I15)
UF 1923 IF UI=2 THEN TA$=MA$(I15-14,I15)
TA 1925 ? CHR$(I-1+A);"- ";TA$
FQ 1930 NEXT I
MO 1940 ? "P- piece (or can, etc.)"
TU 1950 ? :? "Letter for units";:GOSUB 81
   00
JJ 1955 I2=I2+A-1
EF 1960 IF T$>="A" AND T$<=CHR$(I2) THEN
   INGX=ASC(T$)-A+1:RETURN
EK 1970 IF T$="P" THEN INGX=0:RETURN
BZ 1980 GOSUB 8030:GOTO 1900
EA 2100 REM DISPLAY INGREDIENT(ING)
MY 2110 I5=INGUNX(ING)*5
TC 2112 I$=ING$(ING*38-37,ING*38)
JL 2115 IF I5=0 THEN T$="piece":GOTO 2135
DF 2120 IF UI=2 THEN T$=M$(I5-4,I5):GOTO
   2135
TN 2130 T$=E$(I5-4,I5)
VA 2135 IF PRT=0 THEN ? "#";ING," - ";ING
   QUN(ING);" ";T$;" of --":? I$
FS 2140 IF PRT=1 THEN PRINT #3;"#";ING,"
   - ";INGQUN(ING);" ";T$;" of ";I$
CN 2199 RETURN
XM 2200 REM GET INGREDIENT NAME
RA 2205 ? "KNAME OF INGREDIENT ";ING:?
KI 2210 ? "To save time, you can abbrevia
   te the":? "name of the ingredient.  Th
   e computer"
WW 2215 ? "does not know the difference b
   etween":? "an 'EGG, LIGHTLY BEATEN', a
   nd":? "an 'EG'.":?
WX 2220 ? "This part of the entry is just
    to":? "help you keep things straight.
   ":?
RI 2230 ? "Using one line only,":? "enter
    the ingredient --":?
WO 2240 TRAP 2290:INPUT I$:TRAP CLEAR
HL 2250 GOSUB 8200:RETURN
AZ 2290 TRAP CLEAR:GOSUB 8030:GOTO 2230
AZ 2500 REM OUTPUT UNITS
WE 2505 ? "KSELECT OUTPUT UNITS":?
HD 2510 ? "If you want the new recipe in"
GP 2515 ? "U.S. (ENGLISH) units,      ente
   r E":?
FE 2520 ? "If you want METRIC units, ente
   r M"
OQ 2525 ?
VX 2535 ? "Always press RETURN after ever
   y entry."
AZ 2540 GOSUB 8100
YS 2545 IF T$="E" THEN UO=1:RETURN
DY 2547 IF T$="M" THEN UO=2:RETURN
XK 2548 ? :? "PLEASE ENTER E OR M"
ZY 2549 GOSUB 8030:GOTO 2500
XN 2600 REM NEW RECIPE
DB 2605 ? "KNEW RECIPE"
PF 2606 IF NING<1 THEN ? :? "YOU HAVE NOT
    ENTERED ANY INGREDIENTS.":GOSUB 8030:
   GOTO 2699
PZ 2610 ? :? "The new recipe will be disp
   layed":? "one ingredient at a time, us
   ing"
KJ 2612 ? "several different combinations
    of":? "quantity and units.  All of th
   ese"
WX 2614 ? "will be approximately equivale
   nt.":? "(You should be aware that most
    recipe"
ML 2616 ? "quantities are only approximat
   e.)"
UE 2620 ? :? "Jot down the one combinatio
   n you":? "feel most comfortable with f
   or each":? "ingredient.":?
OI 2630 GOSUB 8010:PRT=0:GOSUB 3200
CX 2699 RETURN
UT 2700 REM DISPLAY COMBINATIONS OF UNITS
CI 2705 IF PRT=0 THEN ? "QUANTITY        UN
   ITS":?
IU 2710 INDX=INGUNX(ING)
DV 2712 QUAN=INGQUN(ING)*M
BU 2714 IXWT=11-3*UI:OXWT=11-3*UO
FR 2716 VLWT=1:IF INDX>=IXWT THEN VLWT=2
JO 2720 IF INDX=0 THEN VLWT=0
SA 2726 IF UI=1 THEN QUAN=QUAN*ECON(INDX)
BS 2728 IF UI=2 THEN QUAN=QUAN*MCON(INDX)
IA 2730 ON UI-UO+2 GOTO 2732,2738,2734
DR 2732 QUAN=QUAN*UCON(VLWT):GOTO 2738
VQ 2734 QUAN=QUAN/UCON(VLWT)
UA 2738 REM QUAN IN OUTPUT BASE UNITS
UT 2740 ON VLWT+1 GOTO 2742,2744,2746
BZ 2742 I1=0:I2=0:GOTO 2748
ZZ 2744 I1=1:I2=OXWT-1:GOTO 2748
DR 2746 I1=OXWT:I2=I1+1
HM 2748 REM I1,I2 UNITS LIMITS
YH 2749 N=0
KL 2750 FOR UNDX=I1 TO I2
SI 2752 IF UO=1 THEN Q2=QUAN/ECON(UNDX)
BG 2753 IF UO=2 THEN Q2=QUAN/MCON(UNDX)
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SX 2755 IF Q2>0.05 THEN 2760
DJ 2756 IF UNDX=I1 AND PRT=0 THEN ? "Tiny
     pinch":GOTO 2795
AI 2757 IF UNDX=I1 THEN PRINT #3;" Tiny p
    inch"
ZU 2758 GOTO 2795
MA 2760 IF Q2>(985*UO-970) AND UNDX<I2 TH
    EN 2795
BC 2765 GOSUB 2800:REM FIND CLOSEST FRAC
OI 2770 IF PRT=1 THEN PRINT #3;" ";T$,"
      ";
MM 2772 IF PRT=0 THEN ? " ";T$,"      ";
JW 2775 I5=UNDX*5:I15=I5*3:N=N+1
GD 2780 IF UNDX=0 THEN T$="piece":TA$="":
    GOTO 2790
VR 2782 IF UO=1 THEN T$=E$(I5-4,I5):TA$=E
    A$(I15-14,I15)
OX 2784 IF UO=2 THEN T$=M$(I5-4,I5):TA$=M
    A$(I15-14,I15)
NM 2790 IF PRT=1 THEN PRINT #3;T$;"--";TA
    $
KV 2792 IF PRT=0 THEN ? T$;"--";TA$
ZL 2795 NEXT UNDX
GU 2797 IF PRT=0 THEN ?
XU 2798 IF PRT=1 THEN PRINT #3
CZ 2799 RETURN
LI 2800 REM T$ = CLOSEST FRAC TO Q2
CH 2805 DIFMIN=5:BEST=0:T$="pinch"
RP 2807 IF UO=2 THEN I$=STR$(INT(100*Q2+0
    .5)/100):GOSUB 8200:T$=I$(1,5):RETURN
GE 2810 IF Q2>0.05 AND Q2<0.8*FRAC(1) THE
    N T$="1/16 "
NR 2815 IF Q2<0.8*FRAC(1) THEN 2899
NE 2820 IF Q2>1.1*FRAC(22) THEN 2880
GJ 2825 FOR I=1 TO 22
WE 2830 DIFQ=ABS(Q2-FRAC(I))
CH 2840 IF DIFQ<DIFMIN THEN DIFMIN=DIFQ:B
    EST=I
GM 2845 NEXT I
EV 2850 IF BEST>0 AND DIFMIN<0.3 THEN I5=
    BEST*5:T$=FR$(I5-4,I5)
BM 2870 GOTO 2899
CF 2880 REM HANDLE BIGGER STUFF
VD 2885 IF Q2>9.6 THEN T$=STR$(INT(Q2+0.5
    )):GOTO 2899
ZU 2890 T$=STR$(INT(4*Q2)/4)
DB 2899 RETURN
PT 2900 REM WRAPUP
PD 2905 ? "↖ALL FINISHED":?
YP 2910 ? "What do you want to do next?"
UL 2915 ? :? "A- Show the new recipe agai
    n."
VE 2920 ? :? "B- Change multiplier and re
    compute."
ZQ 2925 ? :? "C- Change the new recipe fr
    om "
ET 2927 TA$="ENGLISH":I$="METRIC"
DA 2928 IF UO>1 THEN TA$="METRIC":I$="ENG
    LISH"
GZ 2930 ? "   ";TA$;" to ";I$;"."
DQ 2935 ? :? "D- Change an ingredient."
FE 2940 ? :? "E- Start over with a new re
    cipe."
UE 2945 ? :? "F- Save recipe to disk."
RP 2950 ? :? "G- Print recipe."
HI 2955 ? :? "H- Get back to the kitchen.
    "
CO 2960 ? :? "Letter for selection";:GOSU
    B 8100
FW 2965 A=ASC("A")
GF 2970 IF T$>="A" AND T$<="H" THEN WRAP=
    ASC(T$)-A+1:GOTO 2999
DT 2995 GOSUB 8030:GOTO 2900
DD 2999 RETURN
QF 3000 REM READ A RECIPE FROM DISK
VG 3005 IOCODE=4:GOSUB 4000
NV 3010 IF IOCODE=0 THEN 3090
QE 3015 TRAP 3070
FQ 3020 INPUT #3,UI,S1,NING,RECIPE$
VL 3025 TRAP CLEAR
VE 3027 ? "Reading recipe:":? RECIPE$:?
FT 3030 FOR ING=1 TO NING
UR 3035 TRAP 3070:INPUT #3,QUAN,UNDX,I$
OF 3040 TRAP CLEAR:GOSUB 60
PQ 3045 INGQUN(ING)=QUAN
ZY 3050 INGUNX(ING)=UNDX
QC 3055 ING$(ING*38-37,ING*38)=I$
YW 3060 NEXT ING
BR 3065 GOSUB 8010
GF 3069 CLOSE #3:RETURN
VG 3070 TRAP CLEAR
SR 3075 ? :? "FILE READ ERROR.  THE FILE
    MAY NOT"
JB 3080 ? "BE A RECIPE MULTIPLIER FILE."
CS 3090 NING=0:S1=0:RECIPE$=""
DH 3095 CLOSE #3:GOSUB 8030
CM 3099 RETURN
NN 3100 REM PRINT RECIPE
PI 3105 GOSUB 3700:IF NING=0 THEN 3199
AP 3110 CLOSE #3:TRAP 3190:FILENAME$="P:"

SH 3115 ? :? "POSITION PAPER TO TOP OF FO
    RM.":GOSUB 8010
BI 3120 OPEN #3,8,0,"P:":TRAP CLEAR:GOSUB
     60
SI 3125 PRINT #3:PRINT #3
EM 3130 PRINT #3;RECIPE$:PRINT #3
IZ 3135 PRINT #3;"Original makes ";S1;" s
    ervings."
MI 3140 PRINT #3;"Conversion makes ";M*S1
    ;" servings."
UQ 3180 PRT=1:GOSUB 3200:PRT=0:CLOSE #3:G
    OSUB 60:RETURN
IS 3190 TRAP CLEAR:IOCODE=8:GOSUB 8300
NT 3195 IF IOCODE=8 THEN 3110
CO 3199 RETURN
JJ 3200 REM CONVERTED RECIPE
FR 3210 FOR ING=1 TO NING
TF 3212 I$=ING$(ING*38-37,ING*38)
GJ 3215 IF PRT=0 THEN ? "↖INGREDIENT ";IN
    G:? :? I$:? :GOTO 3235
GE 3220 PRINT #3:PRINT #3;"------- INGRED
    IENT ";ING;" -------"
XX 3230 PRINT #3;I$:PRINT #3
EQ 3235 I15=INGUNX(ING)*15
BC 3240 IF I15=0 THEN TA$="piece":GOTO 32
    55
MT 3245 IF UI=1 THEN TA$=EA$(I15-14,I15)
TP 3250 IF UI>1 THEN TA$=MA$(I15-14,I15)
HZ 3255 IF PRT=0 THEN ? INGQUN(ING);" ";T
    A$:? "     multiplied by ";M:? "     con
    verts to any of:":? :GOTO 3280
IK 3260 PRINT #3;INGQUN(ING);" ";TA$;" mu
    ltiplied by ";M;" converts to any of:"
    :PRINT #3
GJ 3280 GOSUB 2700:IF PRT=0 THEN GOSUB 80
    10
ZJ 3290 NEXT ING
CQ 3299 RETURN
NJ 3500 REM WRITE RECIPE TO DISK
MG 3502 GOSUB 3700:IF NING=0 THEN RETURN
XQ 3505 IOCODE=8:GOSUB 4000
HD 3510 IF IOCODE=0 THEN RETURN
TJ 3515 TRAP 3580
LH 3520 PRINT #3;UI;",";S1;",";NING;",";R
    ECIPE$
GD 3530 FOR ING=1 TO NING
RS 3540 PRINT #3;INGQUN(ING);",";INGUNX(I
    NG);",";ING$(ING*38-37,ING*38)
ZG 3560 NEXT ING
TK 3570 TRAP CLEAR:CLOSE #3:GOSUB 60:RETU
    RN
EZ 3580 TRAP CLEAR:CLOSE #3:GOSUB 60
KW 3585 ? :? "FILE WRITE ERROR.  CODE ";P
    EEK(195)
IU 3590 GOSUB 8030:RETURN
OU 3700 REM CHECK RECIPE READY
WE 3705 IF NING>0 THEN 3720
YY 3710 ? :? "NO RECIPE IN MEMORY.  YOU M
    UST ENTER"
BN 3712 ? "A RECIPE BEFORE YOU CAN SAVE O
    R PRINT IT."
IU 3715 GOSUB 8030:RETURN
IO 3720 IF UI=1 OR UI=2 THEN 3740
WK 3725 ? :? "YOU MUST SPECIFY WHETHER TH
    E RECIPE"
FJ 3727 ? "IS IN ENGLISH OR METRIC UNITS.
    "
KX 3730 GOSUB 8030:GOSUB 1400
DL 3740 IF S1>0 THEN 3760
QD 3742 S1=1
PL 3745 ? "↖":? :? "How many servings doe
    s your":? "original recipe make";
TH 3750 TRAP 3780:INPUT S1:TRAP CLEAR
WO 3755 IF S1<1 THEN ? "PLEASE ENTER A NU
    MBER AT LEAST 1.":GOSUB 8030:GOTO 3742

TQ 3760 IF LEN(RECIPE$)>0 THEN RETURN
XN 3762 ? "↖Using one line only,":? "ente
    r the name of this recipe:"
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AS 3765 TRAP 3790:INPUT I$:TRAP CLEAR
PG 3770 GOSUB 8200:RECIPE$=I$:RETURN
QK 3780 TRAP CLEAR:GOSUB 8020:GOTO 3745
NG 3790 TRAP CLEAR:GOSUB 8030:GOTO 3760
ZG 4000 REM OPEN DISK FILE
IT 4010 ? "↖FILE SELECTION":?
FT 4020 ? "Enter a file name up to 8 char
   acters":? "long, with an optional exte
   nder."
LJ 4030 ? "Include the disk drive number.
   ":? :? "For example:  D1:BEEFSTEW.REC"
   :?
EC 4040 ? "File name";:INPUT FILENAME$:IF
    LEN(FILENAME$)<3 THEN 4010
US 4050 TRAP 4090:CLOSE #3
ZV 4060 CLOSE #3:OPEN #3,IOCODE,0,FILENAM
   E$
YX 4070 TRAP CLEAR:GOSUB 60:RETURN
IK 4090 TRAP CLEAR:CLOSE #3:GOSUB 8300
VI 4098 IF IOCODE<>0 THEN 4040
CN 4099 RETURN
ZF 7000 REM CHANGE AN INGREDIENT
JW 7005 ? "↖ #  INGREDIENT":?
CH 7010 IF NING=0 THEN ? "THERE ARE NO IN
   GREDIENTS.":GOSUB 8030:RETURN
VA 7020 FOR I=1 TO NING
JA 7030 ? I;"- ";ING$(I*38-37,I*38-5)
FY 7035 NEXT I
UK 7040 ? NING+1;"- Add another ingredien
   t"
UE 7050 ? :? "What is the number of the i
   ngredient":? "you want to change";
ZY 7060 TRAP 7090:INPUT ING:TRAP CLEAR
YR 7065 IF ING<1 OR ING>NING+1 THEN ? "Pl
   ease enter a number from the list.":GO
   SUB 8030:GOTO 7000
CY 7070 IF ING=NING+1 THEN NING=ING
GW 7080 GOSUB 7100:RETURN
ZT 7090 TRAP CLEAR:GOSUB 8020:GOTO 7000
BD 7100 REM ENTER INGREDIENT #ING
AA 7110 GOSUB 1700:IF QUAN=0 THEN 7199
OW 7120 INGQUN(ING)=QUAN
XC 7130 GOSUB 1900:INGUNX(ING)=INGX
ZG 7135 GOSUB 2200
QF 7145 ING$(ING*38-37,ING*38)=I$
NJ 7150 ? "↖INGREDIENT ";ING:?
YZ 7155 GOSUB 2100
TW 7160 POKE 752,0:? :? "Enter  Y  if OK,
    or"
DF 7165 ? :? "Enter  N  to change."
DR 7170 ? :? "OK  ←←";:GOSUB 8100
CJ 7172 IF  NOT (T$="Y" OR T$="N") THEN ?
    "↑↑↑↑↑↑↑";:GOTO 7160
SQ 7175 IF T$<>"Y" THEN 7100
XE 7199 POKE 752,1:RETURN
IB 8000 REM DELAY
HG 8001 SETCOLOR 4,12,8:REM GREEN BORDER
IE 8002 FOR K=1 TO 16
PK 8003 SOUND 0,THEME(K),10,4
PV 8004 FOR D=1 TO 4:NEXT D
GM 8005 NEXT K
YY 8007 SETCOLOR 4,0,0:SOUND 0,0,0,0
BQ 8009 RETURN
HH 8010 REM WAIT FOR RETURN
GX 8011 SETCOLOR 4,8,10:REM BLUE BORDER
DM 8012 ? "Press  RETURN  when ready--"
TK 8014 INPUT #16,T$:SETCOLOR 4,0,0
PP 8019 GOSUB 60:RETURN
JV 8020 REM NUMERIC ERROR
XF 8025 ? "Please enter a decimal number.
   "
NZ 8030 REM ANY ERROR
JX 8035 SETCOLOR 4,4,6:REM RED BORDER
BN 8040 FOR K=1 TO 8
DV 8045 SOUND 0,136+10*K,10,8
SK 8050 FOR D=1 TO 8:NEXT D
HB 8055 NEXT K
YO 8060 SETCOLOR 4,0,0:SOUND 0,0,0,0
CR 8099 RETURN
WR 8100 REM INPUT LETTER TO T$
JE 8110 TRAP 8190:POKE 702,64:REM FORCE C
   APS
ID 8115 POKE 694,0:REM CLEAR INVERSE FLAG
EN 8117 POKE 752,0:INPUT T$:TRAP CLEAR
EI 8120 IF LEN(T$)<>1 THEN 8190
CR 8130 T=ASC(T$):IF T>128 THEN T=T-128:T
   $=CHR$(T):REM CLEAR INVERSE VIDEO
RM 8140 IF T$>="A" AND T$<="Z" THEN 8199
DJ 8190 TRAP CLEAR:? "Please enter a sing
   le letter.":GOSUB 8030
SH 8196 GOTO 8100
WH 8199 SETCOLOR 4,0,0:POKE 752,1:RETURN
VY 8200 REM EXTEND I$ WITH BLANKS
ZK 8210 ILEN=LEN(I$)+1
GT 8220 IF ILEN>38 THEN RETURN
HH 8230 I$(ILEN)=" ":GOTO 8210
OG 8300 REM OPEN ERROR
LJ 8310 ? :? "FILE OPEN ERROR.  CHECK DEV
   ICE ";FILENAME$(1,2)
SG 8320 ? "ERROR CODE IS ";PEEK(195)
CB 8330 GOSUB 8030
AM 8340 ? :? "To abandon, enter  A "
QJ 8350 ? :? "To retry,   enter  R "
EC 8360 GOSUB 8100:IF T$="A" THEN IOCODE=
   0
CX 8399 RETURN
```

forecast the weather with your Atari

WEATHER WIZARD

Article on page 19

LISTING 1

Don't type the TYPO II Codes!

```
FW 2 REM WEATHER WIZARD
PD 4 REM BY RICHARD STAERZL
FU 6 REM (c) 1986, ANTIC PUBLISHING
JZ 8 BRK=1:IF PEEK(53279)=5 THEN BRK=0
RZ 9 DIM W$(2),S$(1),F$(17),T$(6)
ZU 10 GRAPHICS 2:COLOR 4:SETCOLOR 4,9,4:P
   OKE 752,1:GOSUB 910
AQ 15 SENSORS=0
KH 16 MTEMP=-1.38461538:BTEMP=127.115384
EJ 17 MHUM=-0.438596491:BHUM=100.5
PD 20 ? #6;" ":? #6;" ":? #6;" ":? #6;" "
   :? #6;" ":? #6;"   WEATHER WIZARD"
OS 31 ? "             BY DICK STAERZL"
IM 33 ? :? "       (c) 1986, Antic Publishi
   ng":FOR X=1 TO 1000:NEXT X
RI 40 GOSUB 900
SQ 50 ? #6:? #6;" LAST BAROMETER READ":GO
   SUB 3000
KZ 60 TRAP 4320:INPUT A:TRAP 40000:GOSUB
   4300
RL 70 GOSUB 900
FT 80 ? #6:? #6;" PRESENT  BAROMETER":GOS
   UB 3000
NU 90 TRAP 4420:INPUT B:TRAP 40000:GOSUB
   4400
TW 100 GOSUB 900
PF 110 ? #6:? #6;" TIME ELASPED :HOURS":G
   OSUB 3100
```

```
RM 120 TRAP 4200:INPUT T:TRAP 40000:GOSUB
    5000
UC 130 GOSUB 900
VS 140 ? #6;"   WIND DIRECTION":? #6:GOSU
   B 3200
RJ 150 INPUT W$:GOSUB 4000
UI 160 GOSUB 900
OB 170 ? #6:? #6;"  SKY CONDITION IS:":?
   #6:? #6:? #6:? #6
SV 180 ? #6:? #6;"         CLEAR ( C )"
JO 190 ? #6:? #6;" PARTLY CLOUDY ( P )"
NO 200 ? #6:? #6;" MOSTLY CLOUDY ( M )"
WD 210 ? #6:? #6;"      OVERCAST ( O )"
JU 220 ? #6:? #6;"          RAIN ( R )"
QW 225 INPUT S$:GOSUB 4100
SU 230 R=(B-A)/T*100:B=(30.3-B)*100
ZR 240 IF R>=-1.6 AND R<=1.6 THEN D=0
EO 250 IF R>1.6 AND R<2.6 THEN D=-10
FP 260 IF R>=2.6 THEN D=-20
BM 270 IF R>-2.6 AND R<-1.6 THEN D=10
KW 280 IF R<=-2.6 THEN D=20
WT 290 IF B>90 THEN B=90
ME 300 IF B<10 THEN B=10
ON 310 C=B+D+S:IF C>90 THEN C=90:IF C<10
   THEN C=10
NI 320 IF C<10 THEN C=10
IL 330 IF S=40 THEN C=100
AA 340 IF C<50 THEN F$="   FAIR"
VW 350 IF C>30 AND C<70 THEN F$=" UNSETTL
   ED"
IF 360 IF C>50 AND C<100 THEN F$="   RAIN
   "
SQ 370 IF C=100 AND D>0 THEN F$="RAIN END
   ING 12 HR"
VX 380 IF C=100 AND D<0 THEN F$="RAIN END
   ING  6 HR"
XC 390 IF C=100 AND D=0 THEN F$="RAIN END
   ING 24 HR"
XL 400 IF W>5 THEN T$="COLDER":T=9
BW 410 IF W<2 THEN T$=" COLD":T=8
IO 420 IF W>1 AND W<4 THEN T$="WARMER":T=
   4
HB 430 IF W>3 AND W<6 THEN T$=" WARM":T=3
XG 500 GRAPHICS 7:SETCOLOR 0,T,4:COLOR 1:
   SETCOLOR 1,0,4:COLOR 2:SETCOLOR 2,1,12
   :COLOR 3:GOSUB 910
TS 510 GOSUB 3500
ER 520 IF C<70 THEN GOSUB 3600
BA 530 IF C>30 THEN GOSUB 3300
MJ 540 GOSUB 3850:POKE 752,1
DH 550 ? "TEMP  % PRECIP       FORECAST 
          "
PO 560 IF  NOT (SENSORS) THEN ? " "
XW 570 ? T$,C,F$
KE 571 IF (SENSORS) THEN ? " TEMP=";INT(M
   TEMP*PEEK(624)+BTEMP),,
YA 572 IF (SENSORS) THEN ? "HUM=";INT(MHU
   M*PEEK(625)+BHUM)
UP 575 GOSUB 31000
GW 576 ? "Press START to run again.";
ER 580 IF PEEK(53279)<>6 THEN 580
PY 590 GOTO 10
PR 900 GRAPHICS 1:SETCOLOR 4,8,0:COLOR 0:
   SETCOLOR 2,0,0:COLOR 3:POKE 752,1:GOSU
   B 910:RETURN
TU 910 IF BRK THEN POKE 16,112:POKE 53774
   ,112:POKE 77,0:POKE 702,64
ZJ 920 RETURN
CB 3000 ? #6:? #6:? #6;"       *":? #6
OB 3010 ? #6:? #6;"    29   30":? #6
LD 3020 ? #6:? #6;"    *  ?   *":? #6
OO 3030 ? #6:? #6;"    28   31":? #6
PY 3040 ? #6:? #6;"       *"
AQ 3050 RETURN
GE 3100 ? #6:? #6:? #6;"      1 2":? #
   6
SL 3110 ? #6:? #6;"     .   .":? #6
IZ 3120 ? #6:? #6;"    9  ?   3":? #6
SR 3130 ? #6:? #6;"     .   .":? #6
CM 3140 ? #6:? #6;"       6"
AS 3150 RETURN
CE 3200 ? #6:? #6;"       N":? #6
KF 3210 ? #6:? #6;"     *   *":? #6
EP 3220 ? #6:? #6;"    W  ?   E":? #6
KL 3230 ? #6:? #6;"     *   *":? #6
VT 3240 ? #6:? #6;"       5":RETURN
NB 3300 REM .STORM CLOUD
VP 3305 COLOR 2:REM GRAY
OV 3310 R=12
TG 3320 FOR X=-R TO R STEP 1
XU 3330 Y=SQR(R*R-X*X)
EP 3340 PLOT 115+X,15+Y:DRAWTO 115+X,15-Y
ZO 3350 PLOT 135+X,20+Y:DRAWTO 135+X,20-Y
FR 3360 PLOT 127+X,13+Y:DRAWTO 127+X,13-Y
MB 3370 NEXT X
ET 3380 H=3:J=3:GOSUB 3440
HK 3390 K=1:GOSUB 5100
EB 3400 H=2:J=4:GOSUB 3440:FOR N=1 TO 100
   :NEXT N
VC 3410 H=3:J=3:GOSUB 3440:GOSUB 5100:FOR
    N=1 TO 50:NEXT N
HZ 3420 K=K+1:IF K<3 THEN GOTO 3400
AS 3430 RETURN
GJ 3440 COLOR H:PLOT 120,20:DRAWTO 117,26
   :COLOR J:DRAWTO 110,40:DRAWTO 115,35:D
   RAWTO 105,55
HM 3450 DRAWTO 110,50:DRAWTO 100,70
BB 3460 RETURN
KJ 3500 REM .THERMOMETER
YK 3510 COLOR 1
ZA 3520 R=5
TN 3530 FOR X=-R TO R STEP 1
YB 3540 Y=SQR(R*R-X*X)
IB 3550 PLOT 20+X,65+Y:DRAWTO 20+X,65-Y
MC 3560 NEXT X
BZ 3570 PLOT 19,65:DRAWTO 19,30:PLOT 20,6
   5:DRAWTO 20,29:PLOT 21,65:DRAWTO 21,30
BJ 3580 RETURN
TJ 3600 REM SUN
ZK 3610 COLOR 3
OM 3620 R=10
TP 3630 FOR X=-R TO R STEP 1
YD 3640 Y=SQR(R*R-X*X)
MM 3650 PLOT 100+X,20+Y:DRAWTO 100+X,20-Y
ME 3660 NEXT X
OT 3670 A=0:H=1:I=4:J=4:L=4
HT 3680 COLOR 3:PLOT 87,20:DRAWTO 86-A,20
   :PLOT 112,20:DRAWTO 114+A,20:PLOT 100,
   8:DRAWTO 100,7-A:PLOT 100,32
ND 3690 DRAWTO 100,33+A:PLOT 90,12:DRAWTO
    90-A,12-A:PLOT 110,12:DRAWTO 110+A,12
   -A:PLOT 90,30:DRAWTO 90-A,30+A
QP 3700 PLOT 110,30:DRAWTO 110+A,30+A
EV 3710 COLOR H:PLOT 148,27:DRAWTO 150,25
   :DRAWTO 152,27
DJ 3720 COLOR I:PLOT 137,32:DRAWTO 140,35
   :DRAWTO 143,32:PLOT 140,34
EW 3730 COLOR J:PLOT 126,49:DRAWTO 130,45
   :DRAWTO 134,49:PLOT 130,46
TZ 3740 COLOR L:PLOT 116,50:DRAWTO 122,56
   :DRAWTO 128,50:PLOT 122,55
IE 3750 IF A=0 THEN H=4:I=1
KG 3760 IF A=1 THEN I=4:J=1
NE 3770 IF A=2 THEN J=4:L=1
SC 3780 A=A+1:IF A=5 THEN RETURN
KM 3790 GOSUB 5200:FOR G=1 TO 10:NEXT G
UW 3800 GOTO 3680
UZ 3810 GOTO 3680
QQ 3850 REM BAR GRAPH
ZN 3855 V=70-C/2:FOR Q=48 TO 58
XZ 3860 COLOR 2:PLOT Q,70:DRAWTO Q,V:COLO
   R 3:DRAWTO Q,20
JM 3870 NEXT Q
BS 3890 RETURN
TN 4000 X=0:IF W$="N" OR W$="n" THEN W=0:
   X=1
HW 4010 IF W$="NE" OR W$="ne" THEN W=1:X=
   1
IG 4020 IF W$="E" OR W$="e" THEN W=2:X=1
RX 4030 IF W$="SE" OR W$="se" THEN W=3:X=
   1
EK 4040 IF W$="S" OR W$="s" THEN W=4:X=1
VV 4050 IF W$="SW" OR W$="sw" THEN W=5:X=
   1
MS 4060 IF W$="W" OR W$="w" THEN W=6:X=1
RQ 4070 IF W$="NW" OR W$="nw" THEN W=7:X=
   1
QQ 4080 IF X=0 THEN ? "BAD DATA-TRY AGAIN
   ":GOSUB 5020:GOTO 150
```

continued on next page

```
BS 4090 GOSUB 5000:GOTO 160
QB 4100 X=0:IF S$="C" OR S$="c" THEN S=0:
   X=1
HS 4110 IF S$="P" OR S$="p" THEN S=10:X=1
EY 4120 IF S$="M" OR S$="m" THEN S=20:X=1
JC 4130 IF S$="O" OR S$="o" THEN S=30:X=1
OQ 4140 IF S$="R" OR S$="r" THEN S=40:X=1
XF 4150 IF X=0 THEN ? "BAD DATA-TRY AGAIN
   ":GOSUB 5020:GOTO 225
ZQ 4160 GOSUB 5000:GOTO 230
AZ 4200 ? "BAD DATA-TRY AGAIN":GOSUB 5020
   :GOTO 120
ML 4300 IF A<28 OR A>31 THEN 4320
IM 4310 GOSUB 5000:GOTO 70
CF 4320 GOSUB 5020:? "BAD DATA-TRY AGAIN"
   :GOTO 60
OP 4400 IF B<28 OR B>31 THEN 4420
VU 4410 GOSUB 5000:GOTO 100
HM 4420 GOSUB 5020:? "BAD DATA-TRY AGAIN"
   :GOTO 90
WP 5000 FOR Z=150 TO 0 STEP -10:SOUND 0,9
   ,10,Z/10:NEXT Z:RETURN
RH 5020 FOR Z=150 TO 0 STEP -10:SOUND 0,Z
   ,12,Z:NEXT Z:RETURN
GO 5100 FOR L=0 TO 30:SOUND 0,L*8,8,15-L/
   2:SOUND 1,L*8,16,15-L/2:NEXT L
AI 5110 RETURN
WA 5200 FOR F=10 TO 5 STEP -1
QQ 5210 SOUND 1,F,10,8:NEXT F:SOUND 1,0,0
   ,0
XE 5220 FOR F=8 TO 3 STEP -1
QW 5230 SOUND 1,F,10,8:NEXT F:SOUND 1,0,0
   ,0
VE 5240 FOR F=6 TO 1 STEP -1
RC 5250 SOUND 1,F,10,8:NEXT F:SOUND 1,0,0
   ,0
AZ 5260 RETURN
UP 31000 TRAP 31140:OPEN #3,8,0,"P:":TRAP
    4000
VS 31010 FOR Y=0 TO 78 STEP 2
WS 31020 FOR X=0 TO 158 STEP 2
OS 31030 LOCATE X,Y,Z
AP 31040 IF Z=0 THEN ? #3;" ";:GOTO 31080
DG 31045 REM COLOR 1,Z=0 BACKGROUND
KV 31050 IF Z=1 THEN ? #3;"*";:GOTO 31080
BB 31055 REM COLOR 2,Z=1
ZU 31060 IF Z=2 THEN ? #3;"o";:GOTO 31080
CR 31065 REM COLOR 3,Z=2
BK 31070 ? #3;"+";
EH 31075 REM COLOR 4,Z=3
MY 31080 IF X=158 THEN PRINT #3
NV 31090 NEXT X
NA 31100 NEXT Y
WY 31110 ? #3;"          TEMP          ";
YB 31115 ? #3;" % PRECIP ";
PF 31120 ? #3;"                        ";"
   FORECAST ":? #3
FC 31130 ? #3;"          ";T$;"
   ";C;"                        ";F$
BX 31135 IF (SENSORS) THEN ? #3;" TEMP=";
   INT(MTEMP*PEEK(624)+BTEMP),,
BC 31136 IF (SENSORS) THEN ? #3;"HUM=";IN
   T(MHUM*PEEK(625)+BHUM)
DA 31140 CLOSE #3:RETURN
```

starting out

NEW OWNERS COLUMN

Article on page 46.

LISTING 1

Don't type the TYPO II Codes!

```
HZ 10 REM NEW OWNER'S COLUMN, PART 4
PQ 20 REM BY DAVID PLOTKIN
GL 30 REM (c) 1986, ANTIC PUBLISHING
QO 40 DIM QUESTION$(50),ANSWER$(1),YOURAN
   SWER$(1)
VQ 50 XXX=1:YYY=2:ZZZ=3:RT=0:WG=0:REM SET
    UP THE VARIABLES
BO 60 GRAPHICS 0:POKE 752,1
ZM 70 POSITION 4,0:PRINT "NEW OWNER'S COL
   UMN LOGIC TEST"
NB 80 POSITION 3,3:PRINT "ASSUMPTIONS: XX
   X=1 YYY=2 ZZZ=3"
RG 90 POSITION 3,4:PRINT "PRESS T FOR TRU
   E, F FOR FALSE":POSITION 11,5:PRINT "A
   ND Q TO QUIT"
ZF 100 FOR X=0 TO 39:POSITION X,6:PRINT "
   *";:SOUND 0,X*3+20,10,6:NEXT X:SOUND 0
   ,0,0,0
HG 110 RESTORE 1000:TRAP 300:REM FALLS TH
   ROUGH WHEN OUT OF DATA
KQ 120 READ QUESTION$,ANSWER$
HO 130 FOR X=0 TO 38:POSITION X,9:PRINT "
    ";:SOUND 0,200-X*4,10,6:NEXT X:SOUND
   0,0,0,0
RN 140 FOR X=3 TO 30:POSITION X,11:PRINT
   " ";:SOUND 0,200-X*4,10,6:NEXT X:SOUND
    0,0,0,0
GJ 150 X=(39-LEN(QUESTION$))/2:POSITION X
   ,9:PRINT QUESTION$
JK 160 POSITION 3,11:PRINT "TRUE OR FALSE
   ";:INPUT YOURANSWER$
ML 170 IF ANSWER$=YOURANSWER$ THEN GOSUB
   500:RT=RT+1:GOTO 120:REM RIGHT ANSWER
UL 180 IF YOURANSWER$="Q" THEN GRAPHICS 0
   :GOTO 400:REM READY TO QUIT
HX 185 IF YOURANSWER$<>"T" AND YOURANSWER
   $<>"F" AND YOURANSWER$<>"Q" THEN GOTO
   130
WB 190 WG=WG+1:REM ANSWER IS WRONG
ZS 200 FOR X=1 TO 5:POSITION 3,14:PRINT "
   SORRY! ANSWER IS WRONG";:SOUND 0,X*100
   /2,10,4
GU 210 FOR WAIT=1 TO 30:NEXT WAIT:POSITIO
   N 3,14:PRINT "SORRY! ANSWER IS WRONG";
   :SOUND 0,0,0,0
QG 220 FOR WAIT=1 TO 30:NEXT WAIT
XH 230 NEXT X:POSITION 3,14:PRINT "
                          ";
ML 240 GOTO 120
JG 300 GRAPHICS 0:POSITION 3,5:PRINT "THA
   NK YOU FOR TRYING OUT THIS"
XI 310 POSITION 1,6:PRINT "LOGIC TEST IN
   THE NEW OWNER'S COLUMN"
AV 320 POSITION 7,7:PRINT "SEE YOU NEXT M
   ONTH!"
MA 400 POSITION 1,9
FB 410 IF WG=0 THEN PRINT "CONGRATULATION
   S!!! YOU GOT THEM ALL":END
BD 420 PERC=RT/(RT+WG)*100:PRINT "YOU GOT
    ";PERC;"% RIGHT"
LC 430 POSITION 2,12:PRINT "WANT TO TRY A
   GAIN (Y/N)";:INPUT YOURANSWER$
BM 440 IF YOURANSWER$="Y" THEN GOTO 50
ZW 450 POSITION 2,14:PRINT "GOODBYE!!";:E
   ND
```

```
FC 500 FOR X=1 TO 5:POSITION 3,14:PRINT "HURRAY! ANSWER IS RIGHT";:FOR Y=10 TO 30:SOUND 0,X*100/2+Y,10,4:NEXT Y
YY 510 FOR WAIT=1 TO 30:NEXT WAIT:POSITION 3,14:PRINT "HURRAY! ANSWER IS RIGHT";:SOUND 0,0,0,0
QJ 520 FOR WAIT=1 TO 30:NEXT WAIT
QR 530 NEXT X:POSITION 3,14:PRINT "                       ";
ZJ 540 RETURN
PR 999 END
WG 1000 REM DATA FOR QUESTIONS
FT 1010 DATA (XXX=1 AND YYY=2 AND ZZZ=3),T
WS 1020 DATA (XXX>1 OR YYY>2 OR ZZZ=3),T
OF 1030 DATA (XXX=5 AND YYY=2) OR ZZZ>2,T
QK 1040 DATA (XXX+YYY)>0 AND ZZZ=3,T
LG 1050 DATA (XXX=2 OR YYY=2) AND ZZZ=2,F
UE 1060 DATA (XXX=1 AND YYY=3)AND(XXX=3 AND ZZZ=3),F
RB 1070 DATA (XXX=1 OR YYY=3)AND(XXX=3 OR ZZZ=3),T
XN 1080 DATA (XXX=3 AND YYY=2)OR(YYY=4 AND ZZZ=3),F
NB 1090 DATA (XXX<YYY) AND (YYY>ZZZ),F
FE 1100 DATA (XXX<YYY) OR (YYY>ZZZ),T
ZW 1110 DATA (XXX=YYY) OR (YYY=ZZZ) OR (ZZZ=3),T
KW 1120 DATA (XXX=YYY AND YYY=2)OR(ZZZ>YYY),T
UO 1130 DATA (XXX+YYY>YYY+XXX) OR (ZZZ>YYY),T
MR 1140 DATA (XXX+YYY>YYY+XXX) AND (ZZZ>YYY),F
GL 1150 DATA (XXX=5 AND YYY=10)OR(YYY=7 OR ZZZ=3),T
```

game of the month

BOMB SQUAD

Article on page 43

LISTING 1

Don't type the TYPO II Codes!

```
UG 2 REM BOMB SQUAD
ED 3 REM BY PAUL TUPACZEWSKI
DO 4 REM (c) 1982, ANTIC PUBLISHING
CM 10 POKE 106,PEEK(740)
UY 20 DIM EX$(4):EX$="*+, "
FN 25 DIM BSM$(40):BSM$="■":BSM$(40)="■":BSM$(2)=BSM$:BSM$(7,14)="AK=>?AN1"
DK 30 DIM PS1$(30),PS2$(30),PS3$(30),PS4$(30),STOR$(12),LIN(15)
RH 32 RESTORE 35:FOR R=1 TO 15:READ A:LIN(R)=A:NEXT R
FD 35 DATA 0,0,0,0,345,345,345,0,360,360,360,0,385,380,385
PM 40 GOSUB 1070
HB 45 POKE 710,0:GOSUB 915:POKE 559,34
WG 50 GOSUB 875
AA 55 LV=C3:SC=C0:RD=C1:BOMBS=C0:BONUS=C1:EXLV=10000
YV 60 BN=C0:FRZ=C0:SQU=C0
KA 65 GRAPHICS 17:DL=PEEK(560)+PEEK(561)*256+C4:FOR R=DL+C3 TO DL+12:POKE R,7:NEXT R:GOSUB 755:POKE 77,C0:SA=C1
KL 70 POKE 756,ST/256:POKE 710,150:POKE 709,196
GF 75 POSITION C1,C0:? #6;" SCORE  (1&) BONUS"
TG 80 POSITION C1,12:? #6;" HIGH    ROUND LIVES"
GI 85 POSITION C1,C1:? #6;SC:POSITION C1,13:? #6;HS:POSITION 11,13:? #6;RD:POSITION 16,13
ZI 90 FOR R=C1 TO LV:? #6;CHR$(C5);:NEXT R:POSITION 16,C1:? #6;"0":L=RD:LT=C1
KH 95 IF L>C5 THEN L=L-C5:LT=LT+C1:GOTO 95
DR 100 HARD=LT/C2:ENAD=C1+LT:ENAD1=C1+LT:ON L GOTO 105,135,155,195,220
DC 105 COLOR 36:PLOT C8,6:DRAWTO 12,6:PLOT 13,C4:DRAWTO 17,C4:PLOT 13,C8:DRAWTO 17,C8
YX 110 PLOT 7,C4:DRAWTO C3,C4:PLOT 7,C8:DRAWTO C3,C8:COLOR 7:PLOT C0,11:DRAWTO 19,11:PLOT C0,C10:PLOT 19,C10
VS 115 PLOT C0,C3:PLOT C0,C2:PLOT C1,C2:PLOT 18,C2:PLOT 19,C2:PLOT 19,C3
VS 120 RESTORE 485:GOSUB 465
OJ 125 BX=128:BY=30:EX1=60:EY1=90:EX2=190:EY2=80
NO 130 GOTO 240
KT 135 COLOR 36:PLOT C10,11:PLOT C10,C8:PLOT C10,5:PLOT 7,C4:PLOT 7,7:PLOT 7,C10:PLOT 13,C10:PLOT 13,7:PLOT 13,C4
PX 140 COLOR 7:PLOT 9,11:DRAWTO C0,11:DRAWTO C0,C2:PLOT 19,C2:DRAWTO 19,11:DRAWTO 11,11:RESTORE 505:GOSUB 465
ZE 145 BX=50:BY=80:EX1=50:EX2=50:EY1=64:EY2=40
NS 150 GOTO 240
FL 155 COLOR 36:PLOT C5,C4:DRAWTO 9,C8:PLOT 11,C8:DRAWTO 15,C4:PLOT C10,C5:PLOT C4,7:PLOT 16,7
PI 160 RESTORE 500:GOSUB 465
RE 165 COLOR 7:PLOT 9,C2:DRAWTO 11,C2:DRAWTO 11,C3:PLOT 9,C3:DRAWTO 9,C2:PLOT 9,C3:DRAWTO 8,C2:PLOT 11,3:DRAWTO 12,2
KI 170 PLOT C3,C5:PLOT C5,C5:PLOT C4,C4:PLOT 15,C5:PLOT 16,C4:PLOT 17,C5
AY 175 COLOR 36:PLOT C0,11:DRAWTO 19,11:COLOR 7:PLOT 0,10:DRAWTO 2,10:PLOT 0,9:PLOT 0,8:PLOT 1,9:PLOT 19,8:PLOT 19,9
WT 180 PLOT 19,10:DRAWTO 17,10:PLOT 18,9
TB 185 BX=200:BY=30:EX1=70:EX2=60:EY2=64:EY1=40
OA 190 GOTO 240
FI 195 COLOR 36:PLOT C1,11:DRAWTO 18,11:PLOT C1,C4:DRAWTO 18,C4:PLOT C4,C8:PLOT 16,C8:PLOT 8,C8:PLOT 12,C8
UW 200 COLOR 7:PLOT 10,C5:DRAWTO 10,9:PLOT C3,C5:DRAWTO C0,10:PLOT 17,C5:DRAWTO 19,10:PLOT C4,C5:PLOT C3,6:PLOT C5,6
JB 205 PLOT 16,C5:PLOT 15,6:PLOT 17,6
XH 210 RESTORE 510:GOSUB 465:BX=60:BY=60:EX1=128:EX2=115:EY1=64:EY2=20
OA 215 GOTO 240
JD 220 COLOR 7:FOR R=C1 TO 19 STEP C2:FOR T=C3 TO 9 STEP C3:PLOT R,T:NEXT T:NEXT R
AM 225 COLOR 36:FOR R=C2 TO 18 STEP C2:FOR T=C5 TO 11 STEP C3:PLOT R,T:NEXT T:NEXT R
SO 230 RESTORE 515:GOSUB 465
GY 235 BX=128:BY=64:EX1=50:EX2=200:EY1=25:EY2=EY1
```

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XF 240 GOSUB 825
NY 245 X=128:Y=83:POKE 704,72:POKE 706,156:POKE 707,82
BY 250 LR=C0:UPDN=C0:STOR$=MAN$(C1,C12)
FL 255 POKE 705,196:BAL=C1:LFTRGT=C0:BN=C0:FRZ=C0:WT1=C0:WT2=C0:WT3=C0:SQU=C0
OC 260 A=USR(MOVE,C0,PMB,ADR(STOR$),X,Y,C12)
YR 265 POKE 53278,C1:IF SC>=EXLV THEN EXLV=EXLV+10000:LV=LV+(LV<>3):POSITION 15+LV,13:? #6;CHR$(5)
WM 270 IF PEEK(53252)=C8 THEN GOSUB 700
MS 275 IF PEEK(53252)=C2 THEN LR=INT(RND(0)*C3)-C1:UPDN=-INT(RND(0)*C2)
SH 280 IF PEEK(53252)=C1 THEN GOSUB 620
FI 285 IF SQU=C3 THEN SOUND C1,WT3,10,C4:WT3=WT3-7.5:IF WT3<=C0 THEN SOUND C1,C0,C0,C0:SQU=C0
HB 290 IF FRZ=C3 THEN SOUND C2,100-WT2+100*(WT2/C2=INT(WT2/C2)),10,C4:WT2=WT2+C1:IF WT2=30 THEN FRZ=C0:SOUND 2,0,0,0
DN 295 IF PEEK(53279)=6 THEN GOSUB 760:GOTO 50
GH 300 IF PEEK(764)<>33 THEN 320
WY 305 POKE 764,255
FH 310 IF PEEK(764)<>33 THEN 310
XA 315 POKE 764,255
QQ 320 A=USR(MOVE,C1,PMB,ADR(BALL$(SA*C8-7,SA*C8)),BX,BY,C8):SA=SA+C1-7*(SA=C8)
VT 325 A=USR(MOVE,C2,PMB,ADR(EN1$),EX1,EY1,C8)
ZW 330 A=USR(MOVE,C3,PMB,ADR(EN2$),EX2,EY2,C8)
GN 335 S=STICK(C0):UPDN=UPDN-(S=14 OR S=10 OR S=6)-(UPDN>C3)+(UPDN<-C3):LFTRGT=(S>C4 AND S<C12)
FR 340 LR=LR+(S=7 OR S=6 OR S=C5)-(S=11 OR S=10 OR S=9)-(LR>5)+(LR<-5):GOTO LIN(S)
OT 345 STOR$=MAN$(25,36):SOUND C0,100,C8,C4:GOTO 405
SN 360 STOR$=MAN$(37,48):SOUND C0,100,C8,C4:GOTO 405
FN 375 SOUND C0,C0,C0,C0:GOTO 405
IL 380 SOUND C0,100,C8,C4:GOSUB 395:GOTO 405
ZQ 385 SOUND C0,C0,C0,C0:FOR R=C1 TO C2:IF STOR$=MAN$(R*C12+13,R*C12+24) THEN STOR$=MAN$(R*C12-11,R*C12)
LE 390 NEXT R:GOTO 405
UE 395 FOR R=C1 TO C2:IF STOR$=MAN$(R*C12-11,R*C12) THEN STOR$=MAN$(R*C12+13,R*C12+24)
PW 400 NEXT R:RETURN
GU 405 GOSUB 580:X=X+LR:Y=Y+UPDN:UPDN=UPDN+(S<>14 AND S<>C10 AND S<>6)-(UPDN>5):IF Y>91 THEN UPDN=C0:Y=91
VD 410 IF LFTRGT=C0 THEN LR=LR-SGN(LR)
NZ 415 LFTRGT=C0:IF RND(C0)>0.99 AND BN<>C2 THEN GOSUB 670
KV 420 WT1=WT1+(BN=C2):IF WT1=45 THEN COLOR 32:PLOT Z1,Z2:BN=C0
TA 425 IF RND(C0)>0.99 AND FRZ=C0 AND SQU=C0 THEN GOSUB 680
CH 430 WT2=WT2+(FRZ=C2):IF WT2=45 THEN COLOR 32:PLOT Z3,Z4:FRZ=C0
VF 435 IF RND(C0)>0.99 AND FRZ=C0 AND SQU=C0 THEN GOSUB 690
YV 440 WT3=WT3+(SQU=C2):IF WT3=40 THEN COLOR 32:PLOT Z5,Z6:SQU=C0
PH 445 X=X-LR*(X<50)-LR*(X>200):Y=Y+6*(Y<9)
FH 450 IF PEEK(53260) THEN 530
OT 460 GOTO 260
WQ 465 COLOR 129:DA=C1
FM 470 READ XX,YY:IF XX=-C1 THEN 480
PX 475 PLOT XX,YY:PS1$(DA)=CHR$(XX):PS2$(DA)=CHR$(YY):DA=DA+C1:GOTO 470
YY 480 PS1$(DA)=" ":PS2$(DA)=" ":DA=DA-C1:RETURN
ZK 485 DATA 3,3,8,5,13,7,13,3,3,7
MI 490 DATA 7,3,17,3,17,7,7,7,12,5
JH 495 DATA 5,3,5,7,10,5,15,3,15,7,-1,-1
SH 500 DATA 5,3,6,4,7,5,8,6,9,7,11,7,12,6,13,5,14,4,15,3,4,6,16,6,10,4,-1,0
FJ 505 DATA 10,10,10,7,10,4,7,3,7,6,7,9,13,9,13,6,13,3,-1,0
WG 510 DATA 2,10,5,10,15,10,18,10,3,3,8,3,12,3,17,3,4,7,16,7,8,7,12,7,-1,0
DD 515 DATA 2,4,6,4,10,4,14,4,18,4
CT 520 DATA 4,7,8,7,12,7,16,7
ZR 525 DATA 2,10,6,10,10,10,14,10,18,10,-1,0
NM 530 IF SQU=C3 THEN 565
EF 535 FOR R=C0 TO C3:SOUND R,C0,C0,C0:NEXT R:COLOR 32:PLOT Z1,Z2:PLOT Z3,Z4:PLOT Z5,Z6
DD 540 FOR R=C1 TO C4:A=USR(MOVE,C0,PMB,ADR(BOOM$(R*C12-11,R*C12)),X,Y,C12):SOUND C0,100,C0,16-R*C4
TB 545 POSITION 15+LV,13:? #6;EX$(R,R):A=C1^C1:NEXT R:LV=LV-C1:A=USR(MOVE,C0,PMB,ADR("♥"),C0,C0,C1)
TL 547 GOSUB 1400
KK 550 IF LV THEN FOR R=C1 TO 200:NEXT R:GOTO 240
VU 555 GOSUB 575:POSITION 6,6:? #6;"game over":FOR R=C1 TO 500:NEXT R:IF SC>HS THEN HS=SC
RT 560 GOSUB 760:GOTO 50
LX 565 BX=128:BY=20:EX1=110:EY2=20:EY1=20:EX2=145:SC=SC+500:POSITION C1,C1:? #6;SC
EO 570 FOR R=30 TO 50:FOR T=100 TO C0 STEP -R:SOUND C0,T,C10,C4:NEXT T:NEXT R:GOSUB 575:GOTO 460
QR 575 FOR R=C0 TO C3:A=USR(MOVE,R,PMB,ADR("♥"),C0,C0,C1):NEXT R:RETURN
OD 580 REM MOVE ENEMIES
AI 585 IF FRZ=C3 OR SQU=C3 THEN RETURN
JF 590 BX=BX-HARD*SGN(BX-X):BY=BY-HARD*SGN(BY-Y)
GY 595 EY2=EY2+ENAD:IF EY2>19 AND EY2<90 THEN 605
TX 600 EX2=INT(RND(C0)*140)+50:EY2=EY2-ENAD:ENAD=-ENAD
XO 605 EX1=EX1+ENAD1:IF EX1>50 AND EX1<200 THEN 615
ZV 610 EY1=INT(RND(C0)*70)+20:EX1=EX1-ENAD1:ENAD1=-ENAD1
ZT 615 RETURN
SY 620 X1=INT((X-48)/C8):Y1=(INT(Y/C8))
SK 625 LOCATE X1,Y1,ZZ:IF ZZ=46 THEN 645
YT 630 IF ZZ=35 THEN SQU=C3:WT3=255:GOTO 660
JT 635 IF ZZ=45 THEN FRZ=C3:WT2=0:GOTO 665
ZK 640 RETURN
SG 645 BONUS=BONUS+C1:IF BONUS>9 THEN BONUS=9
CL 650 POSITION C10,C0:? #6;BONUS:COLOR 32:PLOT Z1,Z2:BN=C0
DA 651 FOR R=0 TO 15:SOUND 0,121,10,R:SOUND 1,96,10,15-R:NEXT R
AB 655 RETURN
ZE 660 COLOR 32:PLOT Z5,Z6:RETURN
WL 665 COLOR 32:PLOT Z3,Z4:RETURN
RL 670 BN=C2:WT1=C0:Z1=INT(RND(C0)*17)+C2:Z2=INT(RND(C0)*C10)+C2:LOCATE Z1,Z2,ZZ:IF ZZ<>32 THEN 670
VM 675 COLOR 46:PLOT Z1,Z2:RETURN
QT 680 FRZ=C2:WT2=C0:Z3=INT(RND(C0)*17)+C2:Z4=INT(RND(C0)*C10)+C2:LOCATE Z3,Z4,ZZ:IF ZZ<>32 THEN 680
YK 685 COLOR 45:PLOT Z3,Z4:RETURN
MB 690 SQU=C2:WT3=C0:Z5=INT(RND(C0)*17)+C2:Z6=INT(RND(C0)*C10)+C2:LOCATE Z5,Z6,ZZ:IF ZZ<>32 THEN 690
BJ 695 COLOR 35:PLOT Z5,Z6:RETURN
YK 700 REM GOT A BOMB!
TK 705 X1=INT((X-48)/C8):Y1=(INT(Y/C8))
OA 707 LOCATE X1,Y1,ZZ:IF ZZ=129 THEN 715
HI 710 X1=X1+1:LOCATE X1,Y1,ZZ:IF ZZ<>129 THEN RETURN
XM 715 FOR R=C1 TO C3:POSITION X1,Y1:? #6;EX$(R,R):SOUND C0,10,8,20-R*5:NEXT R:SOUND 0,0,0,0:POSITION X1,Y1:? #6;" "
BM 720 BOMBS=BOMBS+C1:SC=SC+C10*RD:FOR R=C1 TO DA:IF ASC(PS1$(R,R))=X1 AND ASC(PS2$(R,R))=Y1 THEN 730
KC 725 NEXT R
ZO 730 PS3$=PS1$(C1,R):PS3$(R)=PS1$(R+C1):PS4$=PS2$(C1,R):PS4$(R)=PS2$(R+C1):POSITION C1,C1:? #6;SC:POSITION 16,C1
UD 735 ? #6;BOMBS:PS1$=PS3$:PS2$=PS4$:IF PS3$<>" " THEN RETURN
YV 740 GOSUB 765
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OD 745 BOMBS=C0:RD=RD+C1:BONUS=C1:GOTO 65

IC 755 PMBASE=INT((PEEK(145)+C3)/C4)*C4:P
   OKE 54279,PMBASE
RV 757 PMB=PMBASE*256:POKE 559,46:POKE 53
   277,C3:POKE 623,1:RETURN
QF 760 FOR R=C0 TO C3:A=USR(MOVE,R,PMB,AD
   R("♥"),C0,C0,C1):POKE 704+R,C0:NEXT R:
   POKE 559,34:POKE 53277,C0:RETURN
NN 765 REM BONUS POINTS
UB 770 GOSUB 760:FOR R=C0 TO C3:SOUND R,C
   0,C0,C0:NEXT R
SF 775 GRAPHICS C0:POKE 710,C0:POKE 752,C
   1:POKE 756,ST/256:?
ON 780 COLOR 47:PLOT C8,7:DRAWTO 32,7:DRA
   WTO 32,17:DRAWTO C8,17:DRAWTO C8,7:POS
   ITION C8,7:? #6;"/"
PF 785 POSITION 15,9:? "YOU GOT ";BOMBS
SO 790 POSITION 17,11:? "BOMBS":GOSUB 815
   :FOR R=C1 TO 300:NEXT R
RZ 795 REM
WR 800 GOSUB 815
IZ 805 FOR R=15 TO C0 STEP -C3:SOUND C0,6
   0,C10,R:NEXT R:SC=SC+BONUS*100:BOMBS=B
   OMBS-C1:IF BOMBS<>C0 THEN 795
KU 810 GOSUB 815:FOR R=C1 TO 300:NEXT R:R
   ETURN
DO 815 POSITION C10,13:? BOMBS;" x ";BONU
   S*100;" BONUS POINTS "
JM 820 POSITION 14,15:? "SCORE: ";SC:RETU
   RN
UF 825 REM "GO!" SCROLL MESSAGE
VH 827 OL=L*C2
VM 830 POKE 704,OL*16-6:POKE 705,OL*16-6:
   POKE 706,OL*16-6:POKE 707,OL*16-6:X=48
   :X1=200:ADD=3.9
DW 835 A=USR(MOVE,C0,PMB,ADR(GO$),X,60,C8
   ):A=USR(MOVE,1,PMB,ADR(GO$(17)),X+C8,6
   0,C8)
GY 840 A=USR(MOVE,C2,PMB,ADR(GO$(9)),X1,6
   0,C8):A=USR(MOVE,C3,PMB,ADR(GO$(25)),X
   1+C8,60,C8)
OC 845 X=X+ADD:X1=X1-ADD:ADD=ADD-0.1:IF X
   <124 THEN 835
PY 850 A=USR(MOVE,C0,PMB,ADR(GO$),125,60,
   C8):A=USR(MOVE,C1,PMB,ADR(GO$(17)),133
   ,60,C8)
RL 855 A=USR(MOVE,C2,PMB,ADR(GO$(9)),125,
   60,C8):A=USR(MOVE,C3,PMB,ADR(GO$(25)),
   133,60,C8)
NO 860 FOR R=C1 TO 200:NEXT R:FOR R=PEEK(
   704) TO PEEK(704)-C10 STEP -C1:POKE 70
   4,R:POKE 705,R:POKE 706,R:POKE 707,R
KL 865 NEXT R
QF 870 FOR R=C0 TO C3:A=USR(MOVE,R,PMB,AD
   R("♥"),C0,C0,C1):NEXT R:RETURN
XO 875 REM TITLE PAGE
NS 880 GRAPHICS 17:DL=PEEK(560)+PEEK(561)
   *256+C4:POKE DL+C3,7:POKE 710,70:POKE
   711,150:POKE 756,ST/256
JU 885 FOR R=21 TO C1 STEP -C1:POSITION C
   0,C2:? #6;BSM$(R,R+18):A=COS(C1):NEXT
   R
WS 890 POSITION 9,C10:? #6;"BY":POSITION
   C3,C12:? #6;"PAUL TUPACZEWSKI"
CE 895 POSITION 5,17:? #6;"PRESS start":P
   OSITION 7,19:? #6;"TO PLAY"
WC 900 POSITION C1,18:? #6;"OR JOYSTICK B
   UTTON"
JV 905 IF PEEK(53279)<>6 AND STRIG(C0) TH
   EN 905
ZH 910 RETURN
BH 915 DIM PMMOV$(100):MOVE=ADR(PMMOV$):R
   ESTORE 950:C1=1:C2=2:C5=5:C8=8:C10=10:
   C12=12:C4=4:C0=0:C3=3
VG 920 FOR X=C1 TO C10*C10:READ N:PMMOV$(
   X)=CHR$(N):NEXT X
IQ 925 DIM MAN$(48),BALL$(64):FOR R=C1 TO
    48:READ D:MAN$(R)=CHR$(D):NEXT R:FOR
   R=C1 TO 64:READ D:BALL$(R)=CHR$(D)
JB 930 NEXT R:DIM EN1$(C8),EN2$(C8):FOR R
   =C1 TO C8:READ D

UT 933 EN1$(R)=CHR$(D):NEXT R:FOR R=C1 TO
    8:READ D:EN2$(R)=CHR$(D)
IO 935 NEXT R:DIM GO$(32):FOR R=1 TO 32:R
   EAD D:GO$(R)=CHR$(D):NEXT R
HR 940 DIM BOOM$(48):FOR R=1 TO 48:READ D
   :BOOM$(R)=CHR$(D):NEXT R
AC 945 RETURN
UF 950 DATA 216,104,104,104,133,213,104,2
   4,105,2,133,206,104,133,205,104,133,20
   4,104,133,203,104,104,133,208
IU 955 DATA 104,104,133,209,104,104,24,10
   1,209,133,207,166,213,240,16,165,205,2
   4,105,128,133,205,165,206,105
IM 960 DATA 0,133,206,202,208,240,160,0,1
   62,0,196,209,144,19,196,207,176,15,132
   ,212,138,168,177,203,164
LT 965 DATA 212,145,205,232,169,0,240,4,1
   69,0,145,205,200,192,128,208,224,166,2
   13,165,208,157,0,208,96
XD 970 DATA 24,36,36,24,212,246,219,254,2
   20,28,28,30
SL 975 DATA 24,36,36,24,43,111,219,127,59
   ,56,56,120
JG 980 DATA 24,36,36,24,212,246,219,254,2
   20,188,172,86
AR 985 DATA 24,36,36,24,43,111,219,127,59
   ,61,58,117
KM 990 DATA 60,126,255,63,63,255,126,60
HA 995 DATA 60,126,255,159,159,255,126,60

SB 1000 DATA 60,126,255,207,207,255,126,6
   0
MP 1005 DATA 60,126,255,231,231,255,126,6
   0
RW 1010 DATA 60,126,255,243,243,255,126,6
   0
EQ 1015 DATA 60,126,255,249,249,255,126,6
   0
RX 1020 DATA 60,126,255,252,252,255,126,6
   0
TB 1025 DATA 60,126,255,126,126,255,126,6
   0
KQ 1030 DATA 66,36,60,90,126,90,102,60
UL 1035 DATA 126,219,255,189,219,102,60,2
   4
FL 1040 DATA 127,0,158,0,146,0,195,0
HV 1045 DATA 0,195,0,158,0,146,0,127
WY 1050 DATA 254,0,73,0,73,0,25,0
JD 1055 DATA 0,25,0,73,0,79,0,254
RX 1060 DATA 255,255,255,255,255,255,255,
   255,255,255,255,255,0,126,126,126,126,
   126,126,126,126,126,126,0

KN 1065 DATA 0,0,60,60,60,60,60,60,60,60,
   0,0,0,0,0,24,24,24,24,24,24,0,0,0
DP 1070 POKE 106,PEEK(106)-5:GRAPHICS 0:C
   HSET=(PEEK(106)+1)*256
DJ 1072 GRAPHICS 2+16:POKE 710,0:POSITION
    7,4:? #6;"ANTIC":POSITION 5,5:? #6;"P
   RESENTS!"
AX 1075 CHI=CHSET/256:ST=CHSET:CLO=0:POKE
    203,CLO:POKE 204,CHI
CV 1080 DIM XFR$(28):XFR$="h[illegible]
   [illegible]◆"
SU 1095 XFR=USR(ADR(XFR$)):RESTORE 1110
HP 1100 READ A:IF A=-1 THEN RETURN
NE 1105 FOR Z=0 TO 7:READ J:POKE CHSET+A*
   8+Z,J:NEXT Z:GOTO 1100
OX 1110 DATA 1,4,8,60,110,94,94,126,60
FR 1115 DATA 3,24,36,90,165,165,90,36,24
RQ 1120 DATA 4,238,221,187,119,0,0,0,0
QJ 1125 DATA 5,24,36,36,24,126,24,36,102
WH 1130 DATA 6,0,0,102,60,24,60,102,0
VN 1135 DATA 7,16,56,56,124,124,254,16,16

HD 1140 DATA 8,0,56,28,126,28,56,0,0
II 1145 DATA 9,0,28,56,126,56,28,0,0
EU 1150 DATA 10,0,0,36,24,24,36,0,0
DI 1155 DATA 11,0,74,36,88,26,36,82,0
IS 1160 DATA 12,137,82,36,154,89,36,74,14

BS 1165 DATA 13,0,24,60,102,102,60,24,0
MQ 1170 DATA 14,66,195,24,36,36,24,195,66

NR 1175 DATA 15,255,195,195,219,219,195,1
   95,255
IA 1180 DATA 16,0,60,118,118,118,118,60,0

OQ 1185 DATA 17,0,28,60,28,28,28,127,0
HE 1190 DATA 18,0,60,110,28,56,112,126,0
KE 1195 DATA 19,0,126,14,28,14,110,60,0
CF 1200 DATA 20,0,14,30,62,110,126,14,0
KZ 1205 DATA 21,0,126,112,124,14,110,60,0

YC 1210 DATA 22,0,60,112,124,118,118,60,0

DG 1215 DATA 23,0,126,14,28,56,112,112,0
KE 1220 DATA 24,0,60,118,60,118,118,60,0
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NG 1225 DATA 25,0,60,118,62,14,28,120,0
BJ 1230 DATA 27,0,240,216,241,219,219,241
 ,0
NQ 1235 DATA 28,0,0,0,206,109,109,205,0
BI 1240 DATA 29,0,6,6,231,182,182,183,0
SE 1245 DATA 30,0,7,12,134,195,195,142,0
AW 1250 DATA 31,0,0,0,57,109,109,60,12
GS 1255 DATA 33,0,60,118,118,126,118,118,
 0
YB 1260 DATA 34,0,124,118,124,118,118,124
 ,0
WO 1265 DATA 35,0,60,118,112,112,118,60,0
CD 1270 DATA 36,0,124,118,118,118,118,124
 ,0
KU 1275 DATA 37,0,126,112,124,112,112,126
 ,0
DI 1280 DATA 38,0,126,112,124,112,112,112
 ,0
EO 1285 DATA 39,0,62,112,112,118,118,62,0
FN 1290 DATA 40,0,118,118,126,118,118,118
 ,0
GI 1295 DATA 41,0,127,28,28,28,28,127,0
KS 1300 DATA 42,0,14,14,14,14,110,60,0
BF 1305 DATA 43,0,118,118,124,124,118,118
 ,0
CB 1310 DATA 44,0,112,112,112,112,112,126
 ,0
AP 1315 DATA 46,0,115,123,127,127,119,115
 ,0
JF 1320 DATA 47,0,60,118,118,118,118,60,0
OB 1325 DATA 48,0,124,118,118,124,112,112
 ,0
VJ 1330 DATA 49,0,60,118,118,118,118,59,0
BN 1335 DATA 50,0,124,118,118,124,118,118
 ,0
PC 1340 DATA 51,0,60,112,60,14,14,60,0
SC 1345 DATA 52,0,127,28,28,28,28,28,0
GC 1350 DATA 53,0,118,118,118,118,118,60,
 0
HZ 1355 DATA 54,0,118,118,118,118,60,24,0
JQ 1360 DATA 56,0,118,118,60,60,118,118,0
RY 1365 DATA 57,0,118,118,60,24,24,24,0
NN 1370 DATA 58,0,126,14,28,56,112,126,0
EA 1375 DATA 59,0,0,0,179,182,182,227,0
WB 1380 DATA 60,0,3,3,143,219,219,207,0
RT 1385 DATA 61,24,56,48,112,96,0,111,0
FL 1390 DATA -1
QQ 1400 IF BX>115 AND BX<140 AND BY>75 TH
 EN BX=128:BY=20
SU 1405 IF EX1>115 AND EX1<140 AND EY1>75
  THEN EX1=110:EY1=20
OH 1410 IF EX2>115 AND EX2<140 AND EY2>75
  THEN EX2=145:EY2=20
BE 1415 RETURN
```

LISTING 2

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YE 10 REM BOMBSQUAD, LISTING 2
UF 20 REM BY PAUL TUPACZEWSKI
GL 30 REM (c) 1986, ANTIC PUBLISHING
AR 35 REM CREATES LINES 25 AND 1080.
CQ 40 REM (LINES 10-220 MAY BE USED WITH
 OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
 AME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "     ANTIC'S GENERIC
 BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
 se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
 C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
 2,255
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
 wn...T-";INT(LM/10);")      "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
 1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
 MANY DATA LINES!":? "CANNOT CREATE FIL
 E!":END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
  LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
 "
HV 1000 DATA 127
VZ 1010 DATA 0500530320680730770320660830
 77036040052048041058066083077036061034
 2230340580660830770360400 52
FB 1020 DATA 0480410610342230340580660830
 77036040050041061066083077036058066083
 077036040055044049052041061
TU 1030 DATA 034187188189190191219220221034155049048056048032068073077032088070
 082036040050056041058088070
AZ 1040 DATA 082036061034104169000133205168169224133206177205145203200208249230
 204230206165206201228208239
XL 1050 DATA 096034155
```



BASIC BIORHYTHMICS

Article on page 77

LISTING 1

```
1000  '
1010  ' ST BASIC Biorhythms
1020  ' Ver. 030386
1030  ' (c) 1986 Antic Publishing
1040  ' Written by Steve Whitney
1050  '
1060  '-------------------------------------------------
1070   gosub INITIALIZE
1080  '
1090   while not finished
1100      gosub BIORHYTHM
1110   wend
1120  end
1130  '
1140  '-------------------------------------------------
1150  COUNTDAYS:
1160   days=0
1170   birthtime=( birthyear*10000+birthmonth*100+birthday )
1180   printtime=( printyear*10000+printmonth*100+printday )
1190   if birthtime > printtime then gosub SWAPDATES
1200   days=( 365.25*( printyear-birthyear-1 ))
1210   if birthmonth<December then gosub RESTOFYEAR
1220   if printmonth>January then gosub FIRSTOFYEAR
1230   gosub FIRSTLASTMONTH
1240  return
1250  '
1260  '-------------------------------------------------
1270  SWAPDATES:
1280   swap birthday,printday
1290   swap birthmonth,printmonth
1300   swap birthyear,printyear
1310  return
1320  '
1330  '-------------------------------------------------
1340  RESTOFYEAR:
1350   for month=birthmonth+1 to December
1360      days=days+month( month )
1370   next month
1380  return
1390  '
1400  '-------------------------------------------------
1410  FIRSTOFYEAR:
1420   for month=January to printmonth-1
1430      days=days+month( month )
1440   next month
1450  return
1460  '
1470  '-------------------------------------------------
1480  FIRSTLASTMONTH:
1490   days=days+month( birthmonth )-birthday
1500   days=days+printday-1
1510  return
1520  '
1530  '-------------------------------------------------
1540  BIORHYTHM:
1550   fullw output
1560   clearw output
```

continued on next page

```
1570    color output, 0, 1, 1, 0
1580    gotoxy ( 15*scalex ),0: color 1: print "Biorhythm!"
1590    gotoxy ( 14*scalex ),1: color 3: print "By Steve Whitney"
1600    gotoxy 0,( 2*scaley ): color 1
1610   '
1620    inrange=FALSE
1630    while not inrange
1640       it=0
1650       print "Enter birth month, day, and year."
1660       print "( M, D, YY ):";
1670       input birthmonth, birthday, birthyear
1680       if birthmonth>=January and birthmonth<=December then it=it+1
1690       if birthday>=1 and birthday<=31 then it=it+1
1700       if birthyear>=0 and birthyear<=99 then it=it+1
1710       if it=3 then inrange=TRUE else print bell$
1720    wend
1730   '
1740    print "Enter the person's name: "
1750    input name$
1760   '
1770    inrange=FALSE
1780    while not inrange
1790       it=0
1800       print "Enter month and year to print."
1810       print "( M, YY ):";
1820       input printmonth, printyear
1830       if printmonth>=January and printmonth<=December then it=it+1
1840       if printyear>birthyear then it=it+1
1850       if printyear<=99 then it=it+1
1860       if it=3 then inrange=TRUE else print bell$
1870    wend
1880   '
1890    month$=name$( printmonth )
1900    year$="19"+right$( str$( printyear ),2 )
1910    title$=name$+" -- "+month$+", "+year$
1920   '
1930    gosub COUNTDAYS
1940   '
1950    dev$=" "
1960    selected=FALSE
1970    while not selected
1980       color 2: print "P";: color 1: print "rinter or ";
1990       color 2: print "S";: color 1: input "creen";dev$
2000       dev$=left$( dev$,1 )
2010       if ( dev$="S" or dev$="s" ) then dev$="s": selected=TRUE
2020       if ( dev$="P" or dev$="p" ) then dev$="p": selected=TRUE
2030       if not selected then print bell$
2040    wend
2050   '
2060    if dev$="s" then gosub ONSCREEN
2070    if dev$="p" then gosub ONPRINTER
2080   return
2090   '
2100   '-----------------------------------------------
2110   ONSCREEN:
2120    clearw output
2130    gosub FANCY
2140    gosub LABEL
2150    color output, 1, 1, 1, 0
2160    gotoxy titlex-len( title$ )/2, 0: print title$
2170    gosub FINDR
2180    for column=1 to 3
2190       color output, 1, column, 2, column
2200       size=.2: j=1-size
2210       gosub CALC
2220       for index=1 to 3
2230             o( index )=s( index )
2240       next index
2250       for j=1 to month( printmonth ) step size
2260             gosub CALC
```

```
2270            co=o( column )
2280            so=s( column )
2290            x1=( 70*scalex )+indx*(j-size): y1=( 80*scaley )-co*50
2300            x2=( 70*scalex )+indx*j: y2=( 80*scaley )-so*50
2310            linef x1, y1, x2, y2
2320            for index=1 to 3
2330                 o( index )=s( index )
2340            next index
2350       next j
2360   next column
2370   '
2380   poke contrl,16
2390   poke contrl+2,1
2400   poke contrl+6,0
2410   poke ptsin,1
2420   poke ptsin+2,0
2430   vdisys(1)
2440   '
2450  GETKEY:
2460   waiting=TRUE
2470   while waiting
2480      keystroke=inp( consol )
2490      if keystroke=helpkey then gosub HELP
2500      if keystroke=escape then waiting=FALSE: finished=TRUE
2510      if keystroke=space then waiting=FALSE: finished=TRUE
2520      if keystroke=cr then waiting=FALSE
2530      if keystroke=F1 then waiting=FALSE
2540      print bell$
2550   wend
2560  return
2570  '
2580  '----------------------------------------------------
2590  HELP:
2600   gotoxy helpx, helpy1: print "+-----------HELP-----------+"
2610   gotoxy helpx, helpy2: print "| Space or ESC = Quit      |"
2620   gotoxy helpx, helpy3: print "| F1 or CR = Do Another    |"
2630   gotoxy helpx, helpy4: print "+--------------------------+"
2640  return
2650  '
2660  '----------------------------------------------------
2670  ONPRINTER:
2680   line0$=string$( 65,"-" )
2690   line0$="     "+line0$+"+"
2700   mid$( line0$, 40, 1 )="*"
2710   mid$( line0$, 10, 1 )="|"
2720   line1$=bl$
2730   mid$( line1$, 70, 1 )="+"
2740   mid$( line1$, 10, 1 )="|"
2750   mid$( line1$, 40, 1 )="*"
2760   line3$=name$+space$( 76-len( name$ )-len( month$ )-len( year$ )-1)
2770   line3$=line3$+month$+" "+year$
2780   width lprint 255
2790   lprint chr$( escape );"0";line3$
2800   lprint
2810   for j=1 to month( printmonth ) step 0.5
2820      gosub CALC
2830      if j=int( j ) then line2$=line0$
2840      if j=int( j ) then mid$( line2$, 2, len( str$( j )))=str$( j )
2850      if j<>int( j ) then line2$=line1$
2860      mid$( line2$, 40+s( 1 )*30, 1 )="P"
2870   '
2880      z=40+s( 2 )*30
2890      if mid$( line2$, z, 1 )<>"P" then mid$( line2$, z, 1 )="E"
2900      if mid$( line2$, z, 1 )="P" then mid$( line2$, z, 1 )="2"
2910   '
2920      z=40+s( 3 )*30: z$=mid$( line2$, z, 1 )
2930      if z$="2" then mid$( line2$, z, 1 )="3"
2940      if not( z$="E" or z$="P" )then mid$( line2$, z, 1 )="I"
2950      if z$="E" or z$="P" then mid$( line2$, z, 1 )="2"
2960   '
```

continued on next page

```
2970       lprint line2$
2980    next j
2990    lprint chr$( escape );"2"
3000    lprint "       -=Low Point, +=High Point, *=Critical Point "
3010    lprint "       P=Physical, E=emotional, I=intelectual cycle"
3020    lprint chr$( formfeed )
3030   return
3040   '
3050   '-----------------------------------------------
3060   CALC:
3070    s( 1 )=sin(( j+pr )/p*pi*2 )
3080    s( 2 )=sin(( j+er )/e*pi*2 )
3090    s( 3 )=sin(( j+ir )/in*pi*2 )
3100   return
3110   '
3120   '-----------------------------------------------
3130   FINDR:
3140    pr=days-int( days/p )*p
3150    er=days-int( days/e )*e
3160    ir=days-int( days/in )*in
3170   return
3180   '
3190   '-----------------------------------------------
3200   LABEL:
3210    for index=0 to month( printmonth ) step 2
3220       x1=( 75*scalex )+( indx*index ): y1=( 25*scaley )
3230       x2=( 75*scalex )+( indx*index ): y2=( 142*scaley )
3240       linef x1, y1, x2, y2
3250    next index
3260    gosub DATES
3270    '
3280    poke contrl,16
3290    poke contrl+2,1
3300    poke contrl+6,1
3310    poke ptsin,3
3320    poke ptsin+2,0
3330    vdisys(1)
3340    '
3350    x1=hlx1: y1=hly
3360    x2=hlx2: y2=hly
3370    linef x1, y1, x2, y2
3380    '
3390    gotoxy labx, laby1: ?"High"
3400    gotoxy labx, laby2: ?"Crit"
3410    gotoxy labx, laby3: ?"Low"
3420    '
3430    gotoxy lacx1, lacy: print "Phy";
3440    color 2
3450    gotoxy lacx2, lacy: print "Emo";
3460    color 3
3470    gotoxy lacx3, lacy: print "Int";
3480    color 1
3490   return
3500    '
3510   '-----------------------------------------------
3520   FANCY:
3530    color 1,1,1,1,1
3540    x=len( title$ )*4+4
3550    restore FANCYDATUM
3560    for index=1 to 4
3570       read x1, y1, x2, y2
3580       linef (x1*scalex), (y1*scaley), (x2*scalex), (y2*scaley)
3590    next index
3600    read x1, y1
3610    color 1,1,1,3,3
3620    fill ( x1*scalex ), ( y1*scaley )
3630   return
3640    '
3650   FANCYDATUM:
3660    data 50, 20, 50, 165
```

```
3670    data 50, 165, 250, 165
3680    data 250, 165, 250, 20
3690    data 250, 20, 50, 20
3700    data 290, 136
3710   '
3720   '-----------------------------------------------------
3730   DATES:
3740    gotoxy datesx, 16
3750    x$( hirez )="1234567891111111111222222222233"
3760    x$( medrez )="1234567891111111111222222222233"
3770    x$( lorez )="2  6   1     2    3"
3780    print x$( rez );
3790   '
3800    gotoxy datesx, 17
3810    x$( hirez )="         0123456789012345678901"
3820    x$( medrez )="         0123456789012345678901"
3830    x$( lorez )="       2     2    0"
3840    print x$( rez );
3850   return
3860   '
3870   '-----------------------------------------------------
3880   INITIALIZE:
3890    dim month( 13 ), o( 3 ), s( 3 ), name$( 12 ), x$( 9 )
3900    rez=peek( systab )
3910    hirez=1: medrez=2: let lorez=4
3920    if rez=lorez then gosub INITLOREZ
3930    if rez=medrez then gosub INITMEDREZ
3940    if rez=hirez then gosub INITHIREZ
3950   '
3960    p=23: e=28: in=33: pi=3.14159265: printday=1
3970    output=2: TRUE=( -1 ): FALSE=( 0 )
3980    helpkey=226: escape=27: space=32: cr=13: F1=187
3990    consol=2: bell=7: finished=FALSE: formfeed=12
4000    bl$=space$( 80 ): bell$=chr$( 7 )
4010    January=1: February=2: December=12
4020   '
4030    month( January-1 )=month( December )
4040    month( December+1 )=31
4050    restore MONTHDATUM
4060    for month=January to December
4070       read  name$( month )
4080       read  month( month )
4090    next month
4100   return
4110   '
4120   MONTHDATUM:
4130    data January, 31, February, 28, March, 31, April, 30
4140    data May, 31, June, 30, July, 31, August, 31
4150    data September, 30, October, 31, November, 30, December, 31
4160   '
4170   '-----------------------------------------------------
4180   INITLOREZ:
4190    scalex=1: datesx=8: labx=1: helpx=10: titlex=15: indx=5
4200    lacx1=5: lacx2=15: lacx3=22: hlx1=50: hlx2=250
4210    scaley=1: laby1=4: laby2=9: laby3=14: hly=80
4220    lacy=1: helpy1=9: helpy2=10: helpy3=11: helpy4=12
4230    xres=319
4240    yres=199
4250   return
4260   '
4270   '-----------------------------------------------------
4280   INITMEDREZ:
4290    scalex=2: datesx=18: labx=2: helpx=10: titlex=30: indx=10
4300    lacx1=10: lacx2=30: lacx3=50: hlx1=100: hlx2=500
4310    scaley=1: laby1=4: laby2=9: laby3=14: hly=80
4320    lacy=1: helpy1=9: helpy2=10: helpy3=11: helpy4=12
4330    xres=639
4340    yres=199
4350   return
4360   '
```

continued on next page

```
4370  '------------------------------------------------------------
4380  INITHIREZ:
4390    scalex=2: datesx=10: labx=2: helpx=10: titlex=30: indx=10
4400    lacx1=10: lacx2=15: lacx3=19: hlx1=100: hlx2=500
4410    scaley=2: laby1=4: laby2=9: laby3=14: hly=160
4420    lacy=1: helpy1=9: helpy2=10: helpy3=11: helpy4=12
4430    xres=639
4440    yres=399
4450  return
```

ST RESOURCE

FILE I/O INTRO

Article on page 87

LISTING 1

```
/*
 *   Character Replacer Program
 *   File: FILEIO.C
 *   version 022886
 *   (c) Antic Publishing
 *   Written by Patrick Bass
 *
 *   The purpose of this program is to demonstrate how to select,
 *        open, modify, and write a particular file on disk.
 *
 *---- Alcyon / Megamax Include File -----------------*/
#include        "osbind.h"

#define    TRUE               (1)
#define    FALSE              (0)
#define    CANCEL             (0)
#define    SELECT             (3)
#define    NO                 (2)
#define    ERROR              (-1)
#define    CON                2
#define    begin              {
#define    end                }
#define    wend               }
#define    repeat             }
#define    next               }
#define    endif              }
#define    not                !
#define    equals             ==
#define    does_not_equal     !=
#define    then
#define    OR                 ||
#define    DELAY              for( delay=0; delay<20000; delay++ );

int   contrl[ 12 ],
      intin[ 256 ], ptsin[ 256 ],
      intout[ 256 ], ptsout[ 256 ],
      workin[]={ 1,1,1,1,1,1,1,1,1,1,2 }, workout[ 57 ],
      handle,
      i, j, k, l, character, rep_character,
      x1, x2, xcen, xres, xcurr,
      y1, y2, ycen, yres, ycurr,
      color, max_color, delay, drive,
      file_handle, read_handle, for_reading,
      bytes_read, button, finished;
```

```
char file_buffer[ 24576 ],
     path[]="a:*.*\0",
     in_filename[]="filename.c   \0",
     out_filename[]="filename.c   \0",

     alert0[]="[1][ -File I/O-   v.022886 ][ Perform ]",

     chralert[]="[3][ Character to convert-> $      ][+1|+32| Select ]",
     repalert[]="[3][  Change to character-> $      ][+1|+32| Select ]",

     oreadalert[]="[3][ Select the file to read from. ][ Select ]",
     owritealert[]="[3][ Select the file to write to. ][ Select ]",

     alert3[]="[3][ Read another file? ][ Yes | No ]",
     alert4[]="[3][ Thanks for using | -File I/O- v.022886 ][ Exit ]";

long      max_len=24576, write_handle, write_bytes;

double    number;

/*--------------------------*/
main()
begin
     initialize();

     do begin

          pick_character();
          pick_replacement();
          read_the_file();
          convert_the_file();
          write_the_file();

     repeat while( not finished );

     terminate();
end

/*----------------------------------*/
initialize()
begin
     appl_init();
     handle=graf_handle( &i, &i, &i, &i );
     v_opnvwk( workin, &handle, workout );

     form_alert( 1, alert0 );

     finished=FALSE;
     for_reading=0;
end

/*----------------------------*/
pick_character()
begin

int  value;

     button=FALSE;
     character=0;
     chralert[ 29 ]='0'; chralert[ 30 ]='0';
     chralert[ 32 ]=' ';

     while( button does_not_equal SELECT ) begin
          button=form_alert( 3, chralert );

          if( button equals 1 ) then character=character+1;
          if( button equals 2 ) then character=character+32;

          value=((character>>4)&0x000f);
          if( value >= 0x0a ) then value=value+0x07;
          value=value+0x30;
```

continued on next page

```
          chralert[ 29 ]=value;

          value=(character&0x000f);
          if( value >= 0x0a ) then value=value+0x07;
          value=value+0x30;
          chralert[ 30 ]=value;

          chralert[ 32 ]=character;
          if(  character equals 0x0000 OR
               character equals 0x005d OR
               character equals 0x007c ) then chralert[ 32 ]=' ';

     wend
end

/*----------------------------*/
pick_replacement()
begin

int  value;

     button=FALSE;
     rep_character=0;
     repalert[ 29 ]='0'; repalert[ 30 ]='0';
     repalert[ 32 ]=' ';

     while( button does_not_equal SELECT ) begin
          button=form_alert( 3, repalert );

          if( button equals 1 ) then rep_character=rep_character+1;
          if( button equals 2 ) then rep_character=rep_character+32;

          value=(( rep_character>>4 )&0x000f );
          if( value >= 0x0a ) then value=value+0x07;
          value=value+0x30;
          repalert[ 29 ]=value;

          value=( rep_character&0x000f );
          if( value >= 0x0a ) then value=value+0x07;
          value=value+0x30;
          repalert[ 30 ]=value;

          repalert[ 32 ]=rep_character;
          if(  rep_character equals 0x0000 OR
               rep_character equals 0x005d OR
               rep_character equals 0x007c ) then repalert[ 32 ]=' ';
     wend

end

/*----------------------------*/
read_the_file()
begin
     form_alert( 1, oreadalert );

     drive=Dgetdrv();
     path[ 0 ]=( drive+'A' );

     fsel_input( path, in_filename, &button );
     if( button does_not_equal CANCEL ) then begin

          read_handle=Fopen( in_filename, for_reading );
          if( read_handle > ERROR ) then begin

               bytes_read=Fread( read_handle, max_len, file_buffer );

          endif
          Fclose( read_handle );
     endif
end
```

```
/*----------------------------------*/
convert_the_file()
begin
    for( i=0; i<bytes_read; i++ ) begin
        if( file_buffer[ i ] equals character ) then begin
            file_buffer[ i ]=rep_character;
        endif
    next
end

/*----------------------------------*/

write_the_file()
begin
    form_alert( 1, owritealert );
    file_handle=ERROR;
    fsel_input( path, out_filename, &button );

    if( button does_not_equal CANCEL ) then begin

        file_handle=Fcreate( out_filename, 0 );
        if( file_handle > ERROR ) then begin

            Fwrite( file_handle, (long)bytes_read, &file_buffer );

        endif
        Fclose( file_handle );
    endif
    button=form_alert( 2, alert3 );
    if( button equals NO ) then finished=TRUE;
end

/*----------------------------------*/
terminate()
begin
    form_alert( 1, alert4 );

    v_clsvwk( handle );
    appl_exit();
end
```

elegant designs from simple equations

MATH ART

Article on page 30

LISTING 1

Don't type the TYPO II Codes!

```
IA 10 REM ARTISTIC MATHEMATICS, LISTING O
   NE
EO 20 REM BY MARIAN LORENZ/ALLAN MOOSE
GL 30 REM (c) 1986, ANTIC PUBLISHING
EY 40 GRAPHICS 2:POKE 712,148:? #6:? #6:?
    #6:? #6;"     ARTISTIC":? #6;"     MATH
   EMATICS"
TH 41 ? #6:? #6;"     part i"
OU 42 ? ,"BY LORENZ/MOOSE":POKE 752,1
UG 43 ? :? "      (c) 1986, ANTIC PUBLISHIN
   G"
RU 44 GOSUB 540
ZZ 45 DIM PR1$(964),PR2$(964),HD$(4),A$(4
   2)
JC 46 A$="h[illegible]◆h[illegible]\h[illegible][hh[illegible]Zh[illegible]Vh[illegible]Uhh[illegible]Th
   h[illegible]!L[illegible]":A$(39,39)=CHR$(34)
VF 47 DRAW=ADR(A$):GRAPHICS 0
OI 50 POKE 752,1:? "↰PRINTER:":? :? "Epso
   n":? "Star/Gemini":? "None":? :? "Choo
   se One"
PB 52 POKE 764,255
BK 53 IF PEEK(764)=42 THEN MODE=24:GOTO 5
   8
EA 54 IF PEEK(764)=62 THEN MODE=16:GOTO 5
   8
WZ 55 IF PEEK(764)=35 THEN MODE=0:GOTO 58

UM 56 GOTO 53
UU 58 POKE 764,255:GM=8:TRAP 60:GRAPHICS
   15
BL 59 GM=15
VA 60 TRAP 40000:GRAPHICS GM+16:GOSUB 750

YZ 70 COLOR 1
IM 80 FOR LINE=0 TO 191 STEP 2
```

continued on next page

```
YH 90 IF GM=8 THEN X=USR(DRAW,0,LINE,159,
   LINE,1):GOTO 100
BJ 95 PLOT 0,LINE:DRAWTO 159,LINE
EF 100 NEXT LINE
ZC 110 REM DETERMINE AN AXIS FOR SINE CUR
   VE
GC 120 GRAPHICS GM+48:GOSUB 750
RF 125 AXIS=INT(192*RND(1))
IC 130 REM DETERMINE AN AMPLITUDE FOR SIN
   E WAVE
DA 140 REM KEEP IT WITHIN SCREEN BOUNDARI
   ES
LK 150 TEMP1=192-AXIS
JL 160 IF AXIS<TEMP1 THEN TEMP2=AXIS
AO 170 IF TEMP1<AXIS THEN TEMP2=TEMP1
EA 180 AMP=INT(TEMP2*RND(1)):IF AMP<3 THE
   N 125
XI 190 REM DETERMINE PERIOD FOR SINE CURV
   E
KL 200 PER=INT(100*RND(1)+1)
RY 210 REM DETERMINE A PHASE SHIFT
WC 220 PHI=6.28*RND(1)
SK 230 REM DETERMINE COLOR
MX 240 HUE=INT(RND(0)*4)
CO 260 REM DETERMINE A SPACING FACTOR
YV 270 FDGFACTR=INT(3*RND(1))+1
FH 280 REM PLOT PICTURE
DO 290 COLOR HUE
ZC 300 FOR X=0 TO 159 STEP FDGFACTR
GO 310 Y=AMP*(SIN(X/PER-PHI))+AXIS
SE 320 IF GM=8 THEN JNK=USR(DRAW,X,AXIS,X
   ,Y,HUE):GOTO 340
JC 330 COLOR HUE:PLOT X,AXIS:DRAWTO X,Y
LV 340 NEXT X
RF 350 REM WAIT FOR USER'S CHOICE OF OPTI
   ONS
RQ 355 GRAPHICS GM+32:GOSUB 750:? "KContinue":? "Print":? "Save":? "Quit";
WV 360 POKE 764,255
XH 370 IF PEEK(764)=18 THEN POKE 764,255:
   GOTO 120:REM CONTINUE
BU 380 IF PEEK(764)=47 THEN POKE 764,255:
   GRAPHICS 0:END :REM QUIT
BV 385 IF PEEK(764)=62 THEN POKE 764,255:
   GOTO 900:REM SAVE AS MICROPAINTER
EM 390 IF PEEK(764)=10 THEN POKE 764,255:
   GOTO 410:REM PRINT
QI 395 GOTO 370
IF 400 REM SCREEN DUMP FROM ANTIC, JAN 19
   84
TB 410 IF MODE=0 THEN ? "KNO PRINTER SELE
   CTED!▒▒▒▒":GOTO 355
LG 415 CLOSE #1:OPEN #1,8,0,"P:":? #1;CHR
   $(27);CHR$(64);CHR$(27);CHR$(51);CHR$(
   MODE)
GF 420 GRAPHICS GM+48:GOSUB 750
DC 430 REM SET LINE SPACING AND MAKE LOOP

VZ 440 RESTORE 460
DC 450 FOR ME=1 TO 4:READ IT:HD$(ME,ME)=C
   HR$(IT):NEXT ME
AP 460 DATA 27,76,192,3
GY 470 PR1$=CHR$(0):PR1$(964)=CHR$(0):PR1
   $(2)=PR1$:PR2$=PR1$
OJ 480 PR1$(1,4)=HD$:PR2$(1,4)=HD$
MS 490 PR1=ADR(PR1$):PR2=ADR(PR2$)
OK 500 DL=PEEK(560)+PEEK(561)*256:SCR=PEE
   K(DL+4)+(PEEK(DL+5))*256
EM 510 FOR X=0 TO 39:PICT=191*40+SCR+X
VI 520 STR=USR(1536,PICT,PR1,PR2):PRINT #
   1;PR1$:PRINT #1;PR2$
XB 530 NEXT X:CLOSE #1:GOTO 355
XB 540 RESTORE 570
QT 550 FOR ME=1536 TO 1746:READ ML:POKE M
   E,ML:NEXT ME
ZN 560 RETURN
QW 570 DATA 104,104,133,204,104,133,203,1
   04,141,192,6,104
YS 580 DATA 141,191,6,104,141,194,6,104,1
   41,193,6,169
SN 590 DATA 1,133,207,169,191,133,208,160
   ,0,177,203,141
TQ 600 DATA 190,6,165,207,240,28,169,0,13
   3,207,173,193
ZO 610 DATA 6,24,105,4,141,193,6,133,205,
   173,194,6
XP 620 DATA 105,0,141,194,6,133,206,76,95
   ,6,169,1
NF 630 DATA 133,207,173,191,6,24,105,4,14
   1,191,6,133
IA 640 DATA 205,173,192,6,105,0,141,192,6
   ,133,206,32
KS 650 DATA 137,6,32,146,6,32,160,6,32,13
   7,6,32
BB 660 DATA 169,6,32,160,6,165,207,240,17
   7,56,165,203
TH 670 DATA 233,40,176,2,198,204,133,203,
   198,208,165,208
LU 680 DATA 201,255,208,151,96,173,190,6,
   41,3,10,10
JQ 690 DATA 170,96,160,0,189,195,6,145,20
   5,232,200,192
LG 700 DATA 4,208,245,96,173,190,6,74,74,
   141,190,6
DD 710 DATA 96,160,0,189,195,6,10,10,10,1
   0,24,113
XI 720 DATA 205,145,205,232,200,192,4,208
   ,238,96,0,0,0,0,0
MA 730 DATA 0,0,0,0,10,5,10,5,10,0,5,0,15
   ,15,15,15
RU 750 IF GM=8 THEN G15=USR(ADR("h▒0▒▒▒1
   ▒▒▒▒▒N▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒▒N▒▒▒▒▒▒▒▒▒W
   ♦"))
BC 755 POKE 708,86:POKE 709,196:POKE 710,
   236:POKE 712,56:POKE 752,1
PJ 820 REM MOVE PLOT & DRAWTO ROUTINES IN
   TO RAM, DELETE BOUNDS CHECKING (COURTE
   SY DAVID SMALL)
RQ 830 DS=USR(ADR("h▒♥▒▒▒▒▒▒▒▒♥▒▒▒♥▒▒▒▒▒K
   ▒▒K▒▒▒<▒▒▒&<▒▒A<▒▒▒▒K▒▒▒▒K▒K♦"))
ZM 840 RETURN
HQ 900 POKE 752,0:? "KSAVE FILENAME";:INP
   UT PR1$
BA 910 IF LEN(PR1$)<3 THEN 930
MX 920 IF (PR1$(1,1)="D" AND (PR1$(2,2)="
   :" OR PR1$(3,3)=":")) OR PR1$="C:" THE
   N 940
GS 930 PR2$="D:":PR2$(3)=PR1$:PR1$=PR2$
PG 940 GRAPHICS GM+48:GOSUB 750:DL=PEEK(5
   60)+PEEK(561)*256
DI 950 TRAP 900:CLOSE #1:OPEN #1,8,0,PR1$

UT 960 DL=PEEK(560)+PEEK(561)*256
MH 970 IO=848:POKE IO+2,11:POKE IO+4,PEEK
   (DL+4):POKE IO+5,PEEK(DL+5):POKE IO+8,
   0:POKE IO+9,30
TT 980 X=USR(ADR("hhh▒LV▒"),16)
PR 990 PUT #1,PEEK(712):FOR X=708 TO 710:
   PUT #1,PEEK(X):NEXT X
VO 1000 CLOSE #1:TRAP 40000:GOTO 355
```

LISTING 2

```
SF 10 REM ARTISTIC MATHEMATICS, LISTING T
   WO
EO 20 REM BY MARIAN LORENZ/ALLAN MOOSE
GL 30 REM (c) 1986, ANTIC PUBLISHING
EY 40 GRAPHICS 2:POKE 712,148:? #6:? #6:?
    #6:? #6;"    ARTISTIC":? #6;"    MATH
   EMATICS"
RO 41 ? #6:? #6;"     part ii"
OU 42 ? ,"BY LORENZ/MOOSE":POKE 752,1
UG 43 ? :? "     (c) 1986, ANTIC PUBLISHIN
   G"
RU 44 GOSUB 540
ZZ 45 DIM PR1$(964),PR2$(964),HD$(4),A$(4
   2)
JC 46 A$="h▒▒▒▒▒▒▒▒♦h▒\h▒[hh▒Zh▒Vh▒Uhh▒Th
   h▒▒▒▒▒!L▒▒":A$(39,39)=CHR$(34)
VF 47 DRAW=ADR(A$):GRAPHICS 0
OI 50 POKE 752,1:? "KPRINTER:":? :? "Epso
   n":? "Star/Gemini":? "None":? :? "Choo
   se One"
CP 52 POKE 764,255:POKE 195,0
BK 53 IF PEEK(764)=42 THEN MODE=24:GOTO 5
   8
EA 54 IF PEEK(764)=62 THEN MODE=16:GOTO 5
   8
WZ 55 IF PEEK(764)=35 THEN MODE=0:GOTO 58
UM 56 GOTO 53
UU 58 POKE 764,255:GM=8:TRAP 60:GRAPHICS
   15
BL 59 GM=15
VA 60 TRAP 40000:GRAPHICS GM+16:GOSUB 750
```

```
YZ 70 COLOR 1
IM 80 FOR LINE=0 TO 191 STEP 2
YH 90 IF GM=8 THEN X=USR(DRAW,0,LINE,159,
   LINE,1):GOTO 100
BJ 95 PLOT 0,LINE:DRAWTO 159,LINE
EF 100 NEXT LINE
ZC 110 REM DETERMINE AN AXIS FOR SINE CUR
   VE
XP 115 GRAPHICS GM+32:GOSUB 750:POKE 752,
   0
XK 120 ? "↖WHERE DO YOU WANT THE AXIS (0-
   191)";:INPUT AXIS
KC 122 MAMP=AXIS:IF MAMP>96 THEN MAMP=192
   -MAMP
IC 130 REM DETERMINE AN AMPLITUDE FOR SIN
   E WAVE
DA 140 REM KEEP IT WITHIN SCREEN BOUNDARI
   ES
BN 150 ? "↖WHAT AMPLITUDE DO YOU WANT (0-
   ";MAMP;")";:INPUT AMP:IF AMP>MAMP THEN
    150
XC 160 REM DETERMINE PERIOD FOR SINE CURV
   E
PZ 170 ? "↖WHAT PERIOD";:INPUT PER:IF PER
   <1 THEN 170
SL 180 REM DETERMINE A PHASE SHIFT
ZY 190 ? "↖WHAT PHASE";:INPUT PHI
SE 200 REM DETERMINE COLOR
KU 210 ? "↖WHAT COLOR";:INPUT HUE
WC 220 PHI=6.28*RND(1)
CI 230 REM DETERMINE A SPACING FACTOR
AE 240 ? "↖WHAT SPACING";:INPUT FDGFACTR
JK 250 IF FDGFACTR<1 THEN 240
FH 280 REM PLOT PICTURE
GR 290 GRAPHICS GM+48:GOSUB 750
ZC 300 FOR X=0 TO 159 STEP FDGFACTR
GO 310 Y=AMP*(SIN(X/PER-PHI))+AXIS
TO 315 TRAP 59
SE 320 IF GM=8 THEN JNK=USR(DRAW,X,AXIS,X
   ,Y,HUE):GOTO 340
JC 330 COLOR HUE:PLOT X,AXIS:DRAWTO X,Y
LV 340 NEXT X
RF 350 REM WAIT FOR USER'S CHOICE OF OPTI
   ONS
RQ 355 GRAPHICS GM+32:GOSUB 750:? "↖Conti
   nue":? "Print":? "Save":? "Quit";
WV 360 POKE 764,255
EK 370 IF PEEK(764)=18 THEN POKE 764,255:
   GOTO 115:REM CONTINUE
TH 380 IF PEEK(764)=47 THEN POKE 764,255:
   POKE 82,2:GRAPHICS 0:END :REM QUIT
BV 385 IF PEEK(764)=62 THEN POKE 764,255:
   GOTO 900:REM SAVE AS MICROPAINTER
EM 390 IF PEEK(764)=10 THEN POKE 764,255:
   GOTO 410:REM PRINT
QI 395 GOTO 370
IF 400 REM SCREEN DUMP FROM ANTIC, JAN 19
   84
TB 410 IF MODE=0 THEN ? "↖NO PRINTER SELE
   CTED![illegible]":GOTO 355
LG 415 CLOSE #1:OPEN #1,8,0,"P:":? #1;CHR
   $(27);CHR$(64);CHR$(27);CHR$(51);CHR$(
   MODE)
GF 420 GRAPHICS GM+48:GOSUB 750
DC 430 REM SET LINE SPACING AND MAKE LOOP
VZ 440 RESTORE 460
DC 450 FOR ME=1 TO 4:READ IT:HD$(ME,ME)=C
   HR$(IT):NEXT ME
AP 460 DATA 27,76,192,3
GY 470 PR1$=CHR$(0):PR1$(964)=CHR$(0):PR1
   $(2)=PR1$:PR2$=PR1$
OJ 480 PR1$(1,4)=HD$:PR2$(1,4)=HD$
MS 490 PR1=ADR(PR1$):PR2=ADR(PR2$)
OK 500 DL=PEEK(560)+PEEK(561)*256:SCR=PEE
   K(DL+4)+(PEEK(DL+5))*256
EM 510 FOR X=0 TO 39:PICT=191*40+SCR+X
VI 520 STR=USR(1536,PICT,PR1,PR2):PRINT #
   1;PR1$:PRINT #1;PR2$
XB 530 NEXT X:CLOSE #1:GOTO 355
XB 540 RESTORE 570
QT 550 FOR ME=1536 TO 1746:READ ML:POKE M
   E,ML:NEXT ME
ZN 560 RETURN
QW 570 DATA 104,104,133,204,104,133,203,1
   04,141,192,6,104
YS 580 DATA 141,191,6,104,141,194,6,104,1
   41,193,6,169
SN 590 DATA 1,133,207,169,191,133,208,160
   ,0,177,203,141
TQ 600 DATA 190,6,165,207,240,28,169,0,13
   3,207,173,193
ZO 610 DATA 6,24,105,4,141,193,6,133,205,
   173,194,6
XP 620 DATA 105,0,141,194,6,133,206,76,95
   ,6,169,1
NF 630 DATA 133,207,173,191,6,24,105,4,14
   1,191,6,133
IA 640 DATA 205,173,192,6,105,0,141,192,6
   ,133,206,32
KS 650 DATA 137,6,32,146,6,32,160,6,32,13
   7,6,32
BB 660 DATA 169,6,32,160,6,165,207,240,17
   7,56,165,203
TH 670 DATA 233,40,176,2,198,204,133,203,
   198,208,165,208
LU 680 DATA 201,255,208,151,96,173,190,6,
   41,3,10,10
JQ 690 DATA 170,96,160,0,189,195,6,145,20
   5,232,200,192
LG 700 DATA 4,208,245,96,173,190,6,74,74,
   141,190,6
DD 710 DATA 96,160,0,189,195,6,10,10,10,1
   0,24,113
XI 720 DATA 205,145,205,232,200,192,4,208
   ,238,96,0,0,0,0,0
MA 730 DATA 0,0,0,0,10,5,10,5,10,0,5,0,15
   ,15,15,15
RU 750 IF GM=8 THEN G15=USR(ADR("[illegible]"))
MO 755 POKE 708,86:POKE 709,196:POKE 710,
   236:POKE 712,56:POKE 752,1:POKE 82,1
PJ 820 REM MOVE PLOT & DRAWTO ROUTINES IN
   TO RAM, DELETE BOUNDS CHECKING (COURTE
   SY DAVID SMALL)
RQ 830 DS=USR(ADR("[illegible]"))
ZM 840 RETURN
HQ 900 POKE 752,0:? "↖SAVE FILENAME";:INP
   UT PR1$
BA 910 IF LEN(PR1$)<3 THEN 930
MX 920 IF (PR1$(1,1)="D" AND (PR1$(2,2)="
   :" OR PR1$(3,3)=":")) OR PR1$="C:" THE
   N 940
GS 930 PR2$="D:":PR2$(3)=PR1$:PR1$=PR2$
PG 940 GRAPHICS GM+48:GOSUB 750:DL=PEEK(5
   60)+PEEK(561)*256
DI 950 TRAP 900:CLOSE #1:OPEN #1,8,0,PR1$
UT 960 DL=PEEK(560)+PEEK(561)*256
MH 970 IO=848:POKE IO+2,11:POKE IO+4,PEEK
   (DL+4):POKE IO+5,PEEK(DL+5):POKE IO+8,
   0:POKE IO+9,30
TT 980 X=USR(ADR("hhh*LVd"),16)
PR 990 PUT #1,PEEK(712):FOR X=708 TO 710:
   PUT #1,PEEK(X):NEXT X
VO 1000 CLOSE #1:TRAP 40000:GOTO 355
```

LISTING 3

```
MP 10 REM ARTISTIC MATHEMATICS, LISTING T
   HREE
EO 20 REM BY MARIAN LORENZ/ALLAN MOOSE
GL 30 REM (c) 1986, ANTIC PUBLISHING
MM 35 REM (CREATES LINES 46, 750 AND 830
   FOR BOTH LISTINGS ONE AND TWO)
CQ 40 REM (LINES 10-220 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IS 45 REM CHANGE LINE 70 AS NECESSARY.)
MG 50 DIM FN$(20),TEMP$(20),AR$(93)
HO 60 DPL=PEEK(10592):POKE 10592,255
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
YS 80 GRAPHICS 0:? "      ANTIC'S GENERIC
    BASIC LOADER"
CD 90 ? ,"BY CHARLES JACKSON"
PW 100 POKE 10592,DPL:TRAP 170
PO 110 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LQ 120 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BK 130 AR$="":READ AR$
XW 140 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
```

continued on next page

```
DG 150 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")          "
UY 160 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 130
MZ 170 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CZ 180 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
AL 200 OPEN #1,8,0,FN$
PP 210 POKE 766,1:? #1;A$;:POKE 766,0
AF 220 CLOSE #1:GRAPHICS 0:? " COMPLETED 
   "
FT 1000 DATA 222
EF 1010 DATA 0520540320650360610341042010
   032400152010052400010961041330921041 33
   09110410413309010413308610 4
DT 1020 DATA 1330851041041330841041041412
   5100216901713303307625212403405806503 6
   040051057044051057041061067
VS 1030 DATA 0720820360400510520411550550
   5304803207307003207107706105603208407 2
   069078032071049053061085083
AO 1040 DATA 0820400650680820400341041730
   4800213320817304900213320916000316907 8
   145208160006177208201015208
HC 1050 DATA 0041690141452082010792080041
   6907814520820019220514423316900713308 7
   096034041041155056051048032
US 1060 DATA 0680830610850830820400650680
   8204003410416200018925222521572521242 32
   224000208245162000189252253
ZP 1070 DATA 1572521252322240752082451621
   2614215212514203812620214206512616923 4
   141246125141247125141248125
XD 1080 DATA 096034041041155
```

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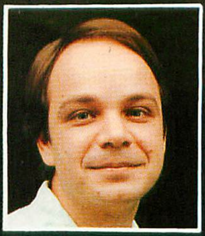
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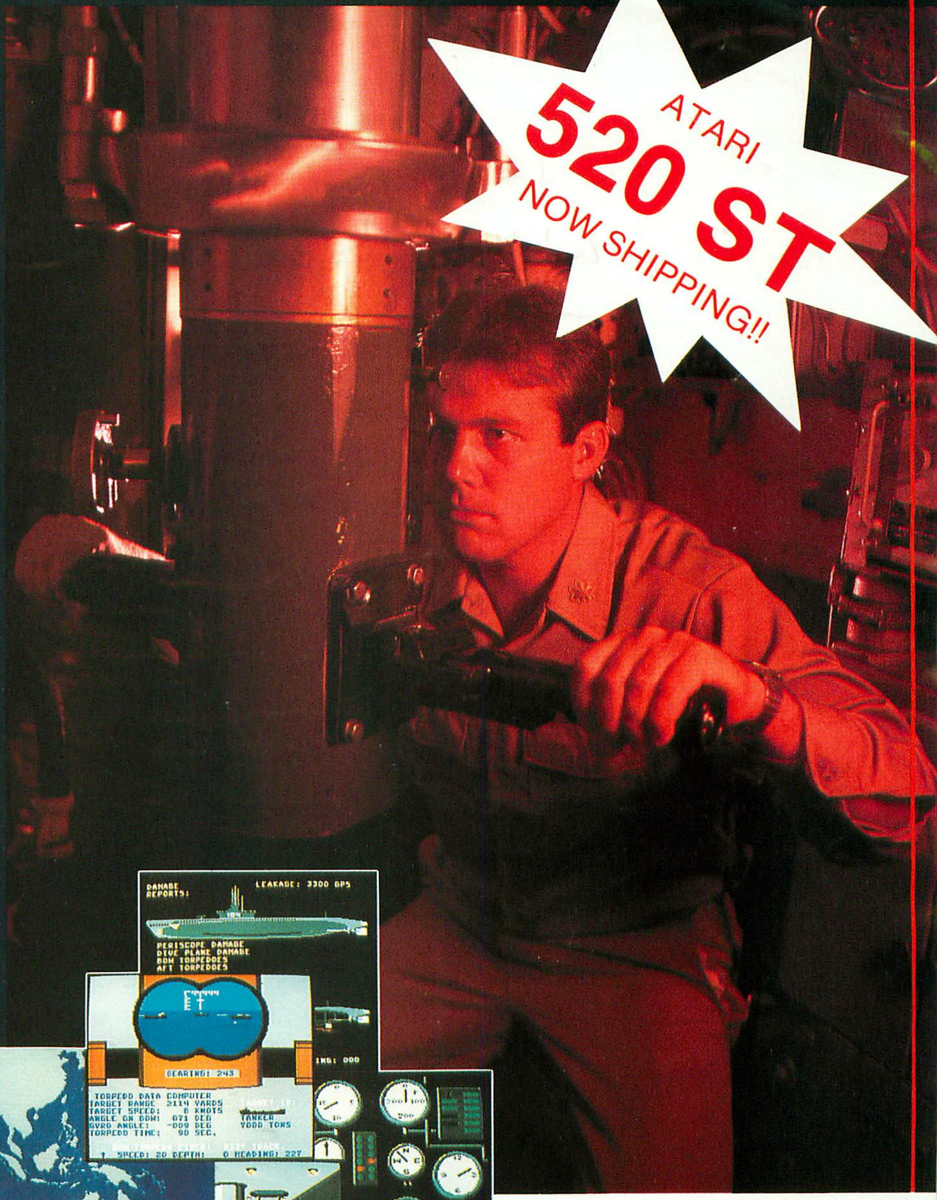
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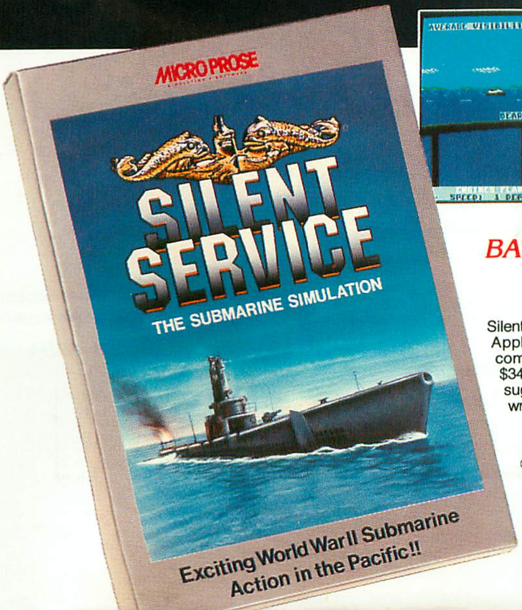


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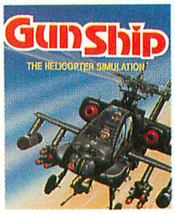


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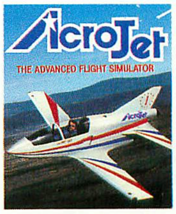
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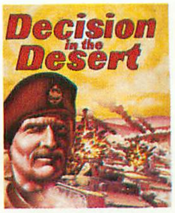
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